Task 2.3.1R

Los Angeles-to-San Diego-
via-
Inland Empire Corridor
High-Speed Train Alignments/Stations
Screening Evaluation

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ACRONYMS

ACE	Alameda Corridor East Construction Authority
AMBAG	Association of Monterey Bay Area Governments
Authority	California High-Speed Rail Authority
BNSF	Burlington Northern Santa Fe
CEQA	California Environmental Quality Act
CETAP	Community and Environmental Transportation Acceptability Process
COG	Council of Governments
CRA	Community Redevelopment Agency
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EMI	electromagnetic interference
FAA	Federal Aviation Administration
FRA	Federal Railroad Administration
IEEP	Inland Empire Economic Partnership
LAWA	Los Angeles World Airports
maglev	magnetic levitation
MAP	millions of air passengers
MCAS	Marine Corps Air Station
MOS	Minimum Operating Segment
MTA	Metropolitan Transportation Authority (Los Angeles County)
VHS	Very High Speed

1.0 INTRODUCTION

Since 1992, extensive information has been gathered and preliminary evaluation has been completed concerning the potential environmental effects associated with numerous high-speed train corridor alternatives throughout California. From feasibility studies through conceptual design, a variety of technical studies have been undertaken to address the engineering, operational, financial, ridership, and environmental aspects of such a system. The findings of these studies concluded that California would benefit substantially from high-speed train transportation. Because of the anticipated benefits and the proven need for additional transportation options, the further evaluation of a high-speed train system is seen as the next logical step in the development of California's transportation infrastructure.

The current stage of project development for a statewide high-speed train system is designed to further optimize alignments, avoid/minimize environmental impacts, and develop a more accurate cost figure based on a more refined level of engineering and environmental analysis. As such, the California High-Speed Rail Authority (Authority) has initiated a formal environmental clearance process through the preparation of a state program-level Environmental Impact Report (EIR) and a federal Tier I Environmental Impact Statement (EIS) or Program EIR/EIS. The Program EIR/EIS will satisfy the requirements of the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) for the first tier of environmental review. As part of the Program EIR/EIS, a number of alternatives are being evaluated including a No-Build Alternative, High-Speed Train Alternative(s), and Other Modal Alternatives (aviation, highway, and conventional passenger rail).

To accomplish this program environmental effort, the Authority has divided the state study area into five regions: Bay Area-to-Merced, Sacramento-to-Bakersfield, Bakersfield-to-Los Angeles, Los Angeles-Orange County-San Diego, and Los Angeles-to-San Diego via the Inland Empire.

1.1 PURPOSE

Within the High-Speed Train Alternative, there is a range of high-speed train alignment and station location options to be considered. The majority of these options have been evaluated in prior studies and have been presented to the previous California Intercity High-Speed Rail Commission and the current Authority. Some corridors were carried forward for further consideration while others have been removed from further study based on their relative merit and viability for potential implementation as part of a statewide high-speed train system. Those corridors that have been carried forward are illustrated in Figure 1.1-1 and documented in the Authority's June 2000 *Final Business Plan*[1] and the December 1999 *California High-Speed Rail Corridor Evaluation*[2].

The purpose of the Alignment Screening Evaluation is to consider all reasonable and practical alignment and station options at a consistent level of analysis and focus the program environmental analysis on the most viable of these alignment and station options. The initial set of alignments and station locations was identified by reviewing prior Commission and Authority studies, through meetings with elected officials, and through the environmental scoping process.

The results of this screening process and information differentiating the alignment and station options are documented herein for the Los Angeles-to-San Diego-via-Inland Empire region. Similar reports are being prepared for the other four regions. Each of the region screening reports will be summarized into a Statewide High-Speed Train Alignments/Stations Screening Evaluation that will be presented to the Authority Board. Based on recommendations by the Authority staff, the Board will select alignments and stations to be carried forward for more detailed analysis in the Program EIR/EIS. An executive summary of this report has also been prepared and is available for review on the Authority's project website.

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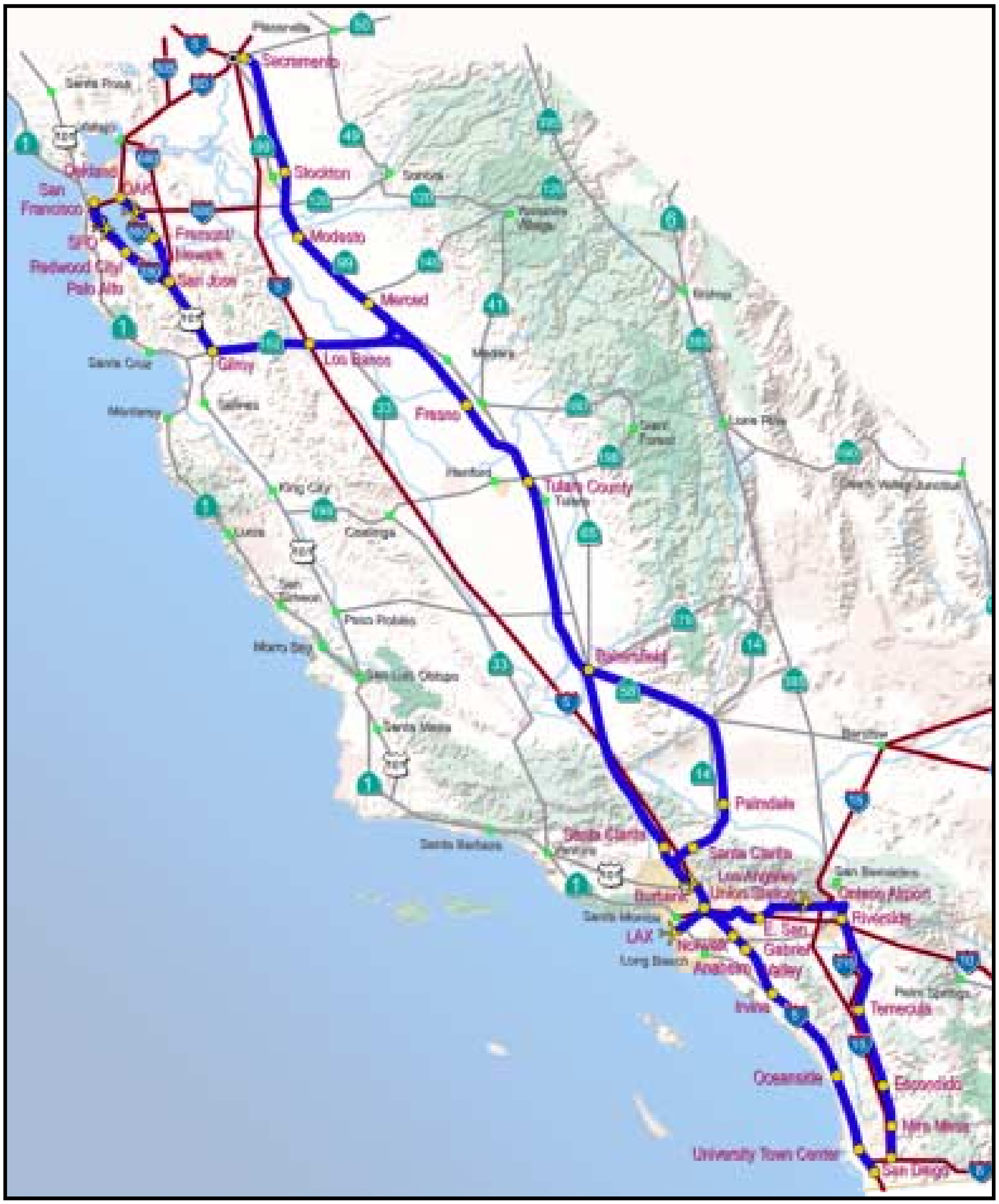
[1] California High-Speed Rail Authority. *Building a High-Speed Train System for California, Final Business Plan*, June 2000.

[2] Parsons Brinckerhoff. *California High-Speed Rail Corridor Evaluation.* Prepared for California High-Speed Rail Authority, December 1999.

Figure 1.1-1
Recommended Corridors to be Studied in the Environmental Process



Source: California High-Speed Rail Authority. *Building a High-Speed Train System for California, Final Business Plan,* 2000.

1.2 BACKGROUND

The California Intercity High-Speed Rail Commission was established in 1993 by Senate Concurrent Resolution (SCR) 6 to investigate the feasibility of a high-speed train system for California, specifically, a system connecting the San Francisco Bay Area, Los Angeles, San Diego, and Sacramento. To address this question of feasibility, the Commission successfully conducted a series of technical studies encompassing ridership and revenue forecasts; economic impact and benefit cost analyses; institutional and financing options; corridor evaluation and environmental impacts and constraints analyses; and preliminary engineering feasibility studies. Based on these studies, the Commission determined that a high-speed train system is technically, environmentally, and economically feasible and set forth recommendations for the technology, corridors, financing, and operation for this system.

The California High-Speed Rail Authority was created by the state Legislature in 1996 (Chapter 796 of the Statutes of 1996 — Senate Bill 1420, Kopp and Costa) to be an implementing agency that would construct, operate, and fund a statewide, intercity high-speed passenger rail system. Based on recently completed studies, evaluations, and previous analysis, the Authority has developed a plan to implement a statewide high-speed train system in California. The current proposal is presented in the Authority's Business Plan. The plan describes a 700-mile (1,126-kilometer) -long system capable of speeds in excess of 200 miles per hour (mph) (320 kilometers per hour [km/h]) on dedicated, fully grade-separated tracks with state-of-the-art safety, signaling, and automated train control systems. The system would serve the major metropolitan centers of California.

Beginning in 1992, several studies pertaining to planning, engineering, ridership/revenue, financing, and economic impact have been completed under the direction of the California Department of Transportation (Caltrans), the past Commission, and the current Authority. These studies provided information that formed the basis of the decisions made and direction of the continuing studies. Because of the nature of this initial screening evaluation, this report primarily references the three planning and engineering studies that have been completed. While these studies differed in terms of their specific scopes of work, they all shared the common focus of identifying potential corridors for the implementation of high-speed train lines and evaluating the feasibility and viability of these corridors. Analysis of environmental constraints through use of existing databases and identification of potential impacts were key components of these studies. The studies were completed in consecutive order, allowing for each subsequent study to benefit from, and build on, the work completed in the prior study. Each of the three studies is described in detail in the *California High-Speed Rail Corridor Evaluation - Environmental Summary Report*[3]. Public involvement was an important part of the feasibility studies. The public was updated on the study progress and key decision points with newsletters and access to the Authority's website.

1.2.1 Los Angeles – Bakersfield Preliminary Engineering Feasibility Study (1994)[4]

Completed in 1994, this study analyzed the feasibility of constructing a high-speed train crossing of the Tehachapi Mountains in Southern California. After considering a broad range of alternative alignments, the study focused on the most viable routes. Two main corridors between Los Angeles and Bakersfield were considered feasible in terms of cost, travel time, and environmental impact: I-5 Grapevine and Palmdale-Mojave. The corridors studied traversed a variety of terrain (urban development, mountains, valley floor, etc.), allowing the engineering and costing analyses to be applicable to other portions of the state. Because of this applicability, work performed for the Los Angeles–Bakersfield study provided an important foundation for the subsequent statewide corridor evaluation studies.

[3] Parsons Brinckerhoff. *California High-Speed Rail Corridor Evaluation - Environmental Summary.* Prepared for California High-Speed Rail Authority, April 2000.

[4] Parsons Brinckerhoff. *Los Angeles - Bakersfield High-Speed Ground Transportation Preliminary Engineering Feasibility Study Final Report*. Prepared for Caltrans, December 1994.

1.2.2 California High-Speed Rail Corridor Evaluation and Environmental Constraints Analysis (1996) [5]

This study was conducted in three phases and was completed in 1996. The first phase defined the most promising corridor alignments for linking the San Francisco Bay Area and Los Angeles. During the second phase, these alternative corridors between Los Angeles and the Bay Area were examined in more detail. The third phase examined potential high-speed train system extensions to Sacramento, San Bernardino/Riverside, Orange County, and San Diego. The study identified station locations and estimated travel times; developed construction, operation, and maintenance cost estimates; analyzed environmental constraints and possible mitigation measures; and, in an iterative process with the Ridership Study, developed a conceptual operating plan. The corridors recommended for further study in Phases 2 and 3 were refined in the corridor evaluation studies completed by the Authority.

1.2.3 California High-Speed Rail Corridor Evaluation (2000)[6]

In September of 1998, the Authority commissioned a Corridor Evaluation study to assess and evaluate the viability of various corridors throughout the state for implementation as part of a statewide high-speed train system. To address new issues raised by local and regional agencies, further corridor investigations and evaluations were conducted in several areas of the State and compared in the context of updated information on previously studied routes. The Authority was mandated to move forward in a manner that was consistent with, and continued the work of the Commission. Using the Commission's recommended corridors as a foundation, potential corridors were further evaluated on the basis of capital, operating and maintenance costs; travel times; and engineering, operational, and environmental constraints. The corridors were compared and evaluated on a regional basis and as part of a statewide system. From this study, the Authority identified corridors to be included in the current stage of project development as part of the Program EIR/EIS.

5 Parsons Brinckerhoff. *California High-Speed Rail Corridor Evaluation and Environmental Constraints Analysis.* Prepared for California Intercity High-Speed Rail Commission, June 1996.

6 Parsons Brinckerhoff. *California High-Speed Rail Corridor Evaluation.* Prepared for California High-Speed Rail Authority, December 1999.

2.0 PARAMETERS/ASSUMPTIONS AND EVALUATION METHODOLOGY

Unless otherwise noted, the objectives, parameters, criteria, and methodologies described in this report are consistent with those applied in previous California high-speed train studies and documented in the *California High-Speed Train Program EIR/EIS, Task 1.5.2 – High-Speed Train Alignment/Station Screening Evaluation Methodology*[7].

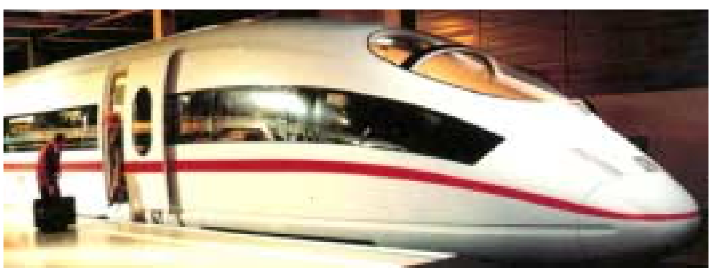
2.1 PARAMETERS/ASSUMPTIONS

High-speed train alignment and station options were developed through consistent application of system, engineering, and operating parameters as described in Task 1.5.2. The parameters and assumptions applied are consistent with those applied in previous planning and engineering studies and are based on accepted engineering practice, the criteria and experiences of other railway and high-speed rail systems, and recommendations of VHS and maglev manufacturers.

2.1.1 Statewide Parameters/Assumptions

The design, cost, and performance parameters used in developing the alignment and station options are based on two technology groups (classified by speed) (Figure 2.1.1). The Very High Speed (VHS) group includes trains capable of maximum operating speeds near 220 mph (350 km/h) utilizing steel-wheel-on-steel-rail technology. Requirements for a VHS system include a dedicated, fully grade-separated right-of-way with overhead catenary for electric propulsion. It is possible to integrate a VHS system into existing conventional rail lines in congested urban areas given resolution of certain equipment and operating compatibility issues. The magnetic levitation (maglev) group utilizes magnetic forces to lift and propel the train along a guideway and is designed for maximum operating speeds above that of VHS technology. A maglev system requires a dedicated guideway and may share right-of-way but not track with conventional train systems.

Figure 2.1-1
VHS and Maglev Technology



VHS Train (Germany ICE)

Maglev (Transrapid)

[7] Parsons Brinckerhoff. *California High-Speed Train Program EIR/EIS, Task 1.5.2 – High-Speed Train Alignments/Stations Screening Evaluation Methodology*. Prepared for California High-Speed Rail Authority, May 2001.

High-speed train system engineering design parameters used in developing the alignments were documented in Task 1.5.2 and include speeds, geometry, and clearances for both steel-wheel-on-steel-rail (VHS) and maglev high-speed train technologies. The parameters and criteria, summarized in Table 2.1-1, are consistent with previous California high-speed train studies and are based on accepted engineering practice, the criteria and experiences of other railway and high-speed train systems, and recommendations of VHS and maglev manufacturers.

Table 2.1-1
Summary of Engineering Design Parameters

Parameter	Very High-Speed	Maglev
Double Track	Full	Full
Power Source	Electric	Electric
Grade Separations	Full	Full
Potential for Shared Use	Yes	No
Corridor Width ❑ **Desirable** ❑ **Minimum**	 100 ft (30.4 m) 50 ft (15.2 m)	 100 ft (30.4 m) 50 ft (15.2 m)
Top Speed	220 mph (350 km/h)	240 mph(1) (385 km/h)
Average Speed	125-155 mph (200-250 km/h)	145-175 mph (230-280 km/h)
Acceleration	0.4-1.3 mph/s(3) (0.6-2.1 km/h/s(4))	1.1-1.9 mph/s (1.8-3.2 km/h/s)
Deceleration	1.2 mph/s (1.9 km/h/s)	1.8 mph/s (2.9 km/h/s)
Minimum Horizontal Radius	500-650 ft (150-200 m)	1,150 ft (350 m) (2)
Minimum Horizontal Radius (at top speed)	15,600 ft @ 220 mph (4,750 m @ 350 km/h)	11,500 ft @ 240 mph (3,500 m @ 385 km/h)
Superelevation ❑ **Actual (Ea)** ❑ **Unbalanced (Eu)**	 7 in (180 mm) 5 in (125 mm)	 16° 5°
Grades ❑ **Desirable Maximum** ❑ **Absolute Maximum**	 3.5% 5.0%	 NA 10.0%
Minimum Vertical Radius Crest Curve (at top speed)	157,500 ft @ 220 mph (48,000 m @ 350 km/h)	205,700 ft @ 240 mph (62,700 m @ 385 km/h)
Minimum Vertical Radius Sag Curve (at top speed)	105,000 ft @ 220 mph (32,000 m @ 350 km/h)	137,100 ft @ 240 mph (41,800 m @ 385 km/h)
Horizontal Clearance (centerline of track to face of fixed object)	10 ft 4 in @ 220 mph (3.1 m @ 350 km/h)	9 ft 5 in @ 240 mph (2.8 m @ 385 km/h)
Vertical Clearance (top of rail to face of fixed object)	21 ft (6.4 m)	12 ft 2 in (3.7 m)
Track Centerline Spacing	15 ft 8 in @ 220 mph (4.7 m @ 350 km/h)	15 ft 9 in @ 240 mph (4.8 m @ 385 km/h)
Minimum Right-of-Way Requirements At-Grade/Cut-and-Fill/Retained Fill Aerial Structure Tunnel (Double Track) Tunnel (Twin Single Track) Trench/Box Section	 50 ft (15.2 m) 50 ft (15.2 m) 67 ft (20.4 m) 120 ft (36.6 m) 70 ft (21.3 m)	 47 ft (14.3 m) 49 ft (15 m) 67 ft (20.4 m) 120 ft (36.6 m) 73 ft (22.2 m)
Minimum Station Platform Length	1,300 ft (400 m)	1,300 ft (400 m)
Minimum Station Platform Width	30 ft (9 m)	30 ft (9 m)

Notes: 1- Top Speed Defined in Federal Maglev Deployment Plan
2- Transrapid USA, 1998.
3- mph/s – miles per hour-second
4- km/h/s – kilometers per hour-second

Based on the minimum requirements listed in Table 2.1-1, three general right-of-way parameters were utilized for the screening evaluation: (1) a minimum right-of-way corridor of 50 feet (15.2 meters) was assumed in congested corridors; (2) a 100-foot (30.4-meter) corridor was assumed in less developed areas to allow for drainage, future expansion and maintenance needs; and (3) a wider corridor was assumed in variable terrain to allow for cut and fill slopes and tunnels.

The overall operations strategy and conceptual service parameters that were assumed for high-speed train service in California are documented in Task 1.5.2. Specific scheduling and operations modeling analysis is currently underway and will be used in future detailed engineering and environmental analyses in the next phase of this study.

2.1.2 Los Angeles-to-San Diego-via-Inland Empire Corridor Parameter/Assumption Variances

No variances to engineering parameters were introduced.

2.2 EVALUATION METHODOLOGY

As listed in Table 2.2-1, a number of key evaluation objectives and criteria were developed based on previous studies with enhancements that reflect the Authority's high-speed train performance goals and criteria described in Task 1.5.2. These objectives and criteria have been applied in the screening of high-speed train alignment and station options developed as part of this process. Each of the evaluation criteria is discussed in Chapter 4.0, Alignment and Station Evaluation.

Table 2.2-1
High-Speed Train Alignment/Station Evaluation Objectives and Criteria

Objective	Criteria
Maximize Ridership/Revenue Potential	▪ Travel Time ▪ Length ▪ Population/Employment Catchment
Maximize Connectivity and Accessibility	▪ Intermodal Connections
Minimize Operating and Capital Costs	▪ Length ▪ Operational Issues ▪ Construction Issues ▪ Capital Cost ▪ Right-of-Way Issues/Cost
Maximize Compatibility with Existing and Planned Development	▪ Land Use Compatibility and Conflicts ▪ Visual Quality Impacts
Minimize Impacts to Natural Resources	▪ Water Resources ▪ Floodplain Impacts ▪ Threatened & Endangered Species Impacts
Minimize Impacts to Social and Economic Resources	▪ Environmental Justice Impacts (Demographics) ▪ Farmland Impacts
Minimize Impacts to Cultural Resources	▪ Cultural Resources Impacts ▪ Parks & Recreation/Wildlife Refuge Impacts
Maximize Avoidance of Areas with Geologic and Soils Constraints	▪ Soils/Slope Constraints ▪ Seismic Constraints
Maximize Avoidance of Areas with Potential Hazardous Materials	▪ Hazardous Materials/Waste Constraints

The engineering and environmental methodologies and assumptions used in evaluating the high-speed train alignment and station options are described in detail in Task 1.5.2.

2.2.1 Engineering Evaluation Criteria

The engineering evaluation criteria focus on cost and travel time as primary indicators of engineering viability and ridership potential. Items such as capital costs and travel times have been quantified for each of the alignment and station options considered. Other engineering criteria such as operational, construction, and right of way issues are presented qualitatively.

The evaluation criteria presented are consistent with the criteria applied in the previous corridor evaluation study and are based on accepted engineering practice, the criteria and experiences of other railway and high-speed train systems, and recommendations of VHS and maglev manufacturers.

A. LOS ANGELES UNION STATION-TO-SAN DIEGO-VIA-INLAND EMPIRE CORRIDOR ENGINEERING METHODOLOGY VARIANCES

No variances to the above-described evaluation criteria were introduced. All alignments were assessed using the same evaluation criteria.

2.2.2 Environmental Evaluation Criteria

The objectives related to the environment and the criteria used for evaluation are consistent with NEPA and CEQA. The environmental constraints and impacts criteria focus on environmental issues that can affect the location or selection of alignments and stations.

To identify potential impacts for the alignments and station locations, a number of readily available resource agency-approved Geographic Information System (GIS)-compatible digital data sources were used along with published information from federal, state, regional, and local planning documents and reports. For evaluation of alignments and stations, right-of-way widths dictated by engineering requirements were utilized to identify the amount of area within each segment containing certain characteristics. Some environmental issues required using various buffer widths that extended beyond the conceptual right-of-way for the segments. Where noted, field reconnaissance was required to view on-the-ground conditions and to provide relative values of certain resources.

A. LOS ANGELES UNION STATION-TO-SAN DIEGO-VIA-INLAND EMPIRE CORRIDOR ENVIRONMENTAL METHODOLOGY VARIANCES

Other than variances listed and discussed below, methodologies described in Task 1.5.2 were used in the evaluation of environmental issues.

<u>Visual Quality</u>

A series of visual simulations were created to gather opinions at public scoping meetings. The visual simulations were prepared to understand two primary points that would reveal how visual impacts should be evaluated.

1. How the public views the visual character of the infrastructure necessary for high-speed trains
2. The viewer's exposure and/or sensitivity to these structures

The objective of gathering responses to visual simulations is to understand the sensitivity of the community through which the train will be passing. In order to understand the perspective of the community, different construction types were superimposed on photographs of different landscape units.

There are no examples of very high-speed trains (maximum operating speeds near 220-mph [350]) within the United States. Therefore, it is difficult to assess how receptive the public would or would not be to a new high-speed train corridor.

There was considerable discussion among the members of the public about whether the impacts are to the viewer looking at the train or to the viewer on the train looking at the environment. Many respondents were enthusiastic about riding above grade so that the views from the train would be enhanced. Impacts to the community received more mention and more sensitivity. Therefore, the objective of gathering responses to visual simulations was to understand the sensitivity of the community through which the train would be passing. In order to understand the perspective of the community, different construction types were superimposed on photographs of different landscape units. A typical landscape unit might be a residential community, a commercial district, an open-space area, or natural landscape features such as a lake, a ravine, or a mountainside. In addition to these landscape units, another facet of sensitivity was analyzed: points of historical significance or recognized points of interest. These are smaller units, but contribute differently to the visual sensitivity. The following seven visual simulations were prepared and viewed by the public at the scoping meetings:

1. An at-grade facility in an industrial corridor
2. An aerial structure in front of a renovated historical train station (Pomona Station)
3. An aerial structure over a neighborhood to meet up with an existing rail corridor
4. An aerial structure in front of an historical landmark (San Gabriel Mission) (Figure 2.2-1)
5. An expanded rail trench in an existing residential neighborhood (Figure 2.2-2)
6. A new trench in an existing at-grade railroad corridor in a suburban environment
7. A tunnel into a natural hillside

Figure 2.2-1
Aerial Structure in Front of San Gabriel Mission
[Note: This is a characature of a high-speed train. More detailed engineering will be done at a later time.]

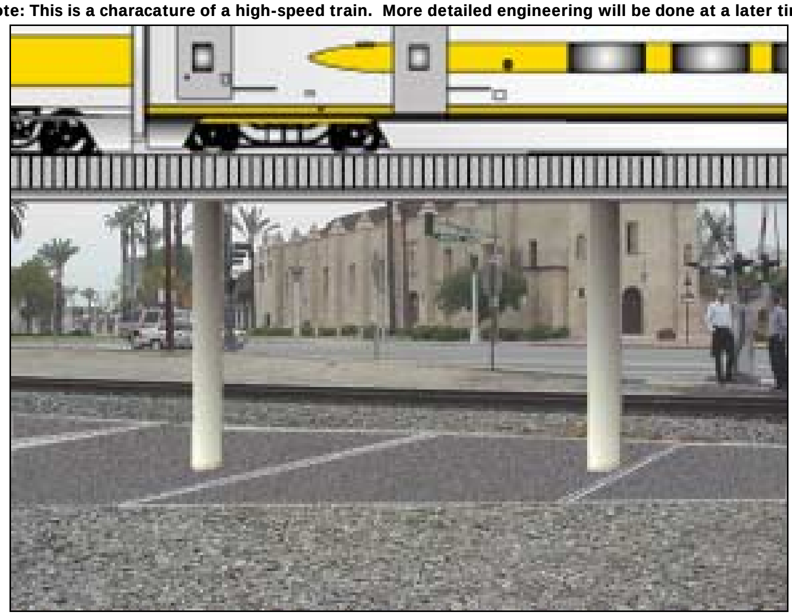


Figure 2.2-2
Expanded Rail Trench in Existing Residential Area
[Note: This is a characature of a high-speed train. More detailed engineering will be done at a later time.]

The visual assessment is based upon feedback received from public comments on the visual simulations on over 40 comment cards from members of the public at the following scoping meetings: Los Angeles, Riverside, and San Diego. The responses from each scoping meeting consistently rated aerial structures in front of historic buildings as a negative impact to the community. Respondents also preferred the trench-and-tunnel alternatives. Variances were found in how communities felt about at-grade facilities and aerials that passed by residential communities. However, opinions varied closely around a neutral impact.

Visual Character of Very High-Speed and Magnetic Levitation (Maglev) Trains

There are two technologies being considered along these corridors. The first is steel-wheel-on-steel-rail. There are examples of this type of train in Europe and Asia. Of the two technologies being evaluated, the steel-wheel–on-steel-rail is more familiar because it has been employed successfully in several countries. Because this system is electrified, there are catenaries, which appear similar to utility lines that connect with an electric pantograph on top of the train. These poles extend from the rail alignment upward 25 feet (7.6 meters). The trains are modern and have jet-like designs. If the elevated tracks were over existing transportation corridors, then the piers would support a platform a minimum of 20 feet (6.1 meters) in the air, placing the windows of the train approximately 30 feet (9.1 meters) in the air, the equivalent of a three-story building.

The second technology is called Magnetic Levitation (Maglev). The electrification of this technology is actually in the rail guideway and, therefore, there are no catenary poles. Maglev would likely require elevated structures for most of the alignment. The typical height would be similar to a steel-wheel-on-steel-rail in that the elevated structure would be a minimum of 20 feet (6.1 meters) high. Again, the passenger windows of the train would be approximately 30 feet (9.1 meters) from the ground. The appearance of the train is a metal shell that wraps around the rail line, like a monorail, thus appearing wider than most passenger rail trains (see Figure 2.1-1).

At the public meetings, the train technology and resulting visual effect have not been determining issues.

Visual Character of Station Locations

Specific station plans have not been developed. Stations will be designed and developed in cooperation with the hosting community and stakeholders in keeping with the local zoning ordinances and design standards. However, there are two factors that may serve as sensitive visual determinants:

- The environmental scale of the area where the station is being placed
- The historical context of the environment

High-speed train stations would be similar to a regional commercial airport in scale and the need to provide expedient through-movement of passengers. The station locations would likely need to include a 400-meter-long platform, substantial parking, internal circulation for passenger drop-off and pick-up for automobiles, buses, and taxis. Space would be needed for other services, such as rental cars, food, and other amenities. All these services would demand a relatively large land area. If a station location is being proposed in an older downtown location where blocks are typically 500 feet (152.0 meters) by 500 feet (152.0 meters), a station location could require many blocks, thereby introducing a new scale to the environment.

The other consideration is the historical context. While it is preferable to construct intermodal facilities in conjunction with existing train stations, it may be difficult to accommodate the addition of a grade separated system, and necessary support services, and still preserve the context of historic train stations. Public responses to the visual simulations of an aerial structure at an historic station underscored their preferences for maintaining the historical context of the station.

Based upon the visual simulation comment cards, Table 2.2-2 illustrates how construction type has varying degrees of receptability, depending on the landscape unit from the viewer of the train passing by low, medium, and high, with high meaning most negative impact.

Table 2.2-2
Key for Visual Impact of Train Passing by Viewer in Community by Construction Type and Landscape Unit

	Type of Construction			
Landscape Unit	**At-Grade**	**Aerial**	**Tunnel**	**Trench**
Urban-Residential	Medium	High	Low	Medium
Urban-Commercial	Medium	Low	Low	Low
Urban-Industrial	Low	Low	Low	Low
Downtown/City Center	Low	Medium/High	Low	Medium
Open Landscape	Medium	Medium	Low	N/A
Point of Interest	Medium/High	High	Low	Medium

This analysis has been completed for each alternative. An example of one corridor analysis is shown in Table 2.2-3, with high meaning most negative impact.

Table 2.2-3
Detailed Visual (Sample)

Alignment Alternative	Segment / Construction Type	Landscape Unit Type	Landscape Unit Length	Visual Assessment
Alternative Alignment 1.a. UP Colton				
Union Station to El Monte	Urban- Aerial	Industrial	(From Union Stn. to Alhambra)	Low
	Urban- Aerial	Commercial	(From Alhambra to El Monte)	Medium
	Urban- Aerial	Special Feature	(From San Gabriel Mission)	High
	Urban-Depressed	Industrial	(From Union Stn. to Alhambra)	Low
	Urban-Depressed	Commercial	(From Alhambra to El Monte)	Low
	Urban-Depressed	Special Feature	(San Gabriel Mission)	Medium
El Monte to Pomona/At-Grade	At-Grade	Commercial/ Industrial	(From El Monte to Pomona)	Medium
	At-Grade	Special Feature	(From Pomona Metrolink Station)	High
Pomona to Ontario Airport/At-Grade	At-Grade	Commercial	(From Pomona to Ontario Airport)	Medium
Ontario Airport to Riverside	Urban- Aerial	Industrial	(From Ontario to Colton)	Low
	Aerial	Residential	(From Colton to Riverside)	High
	Depressed	Industrial	(From Ontario to Colton)	Low
	Depressed	Residential	(From Colton to Riverside)	Medium
Riverside to March ARB	Aerial	Residential	(From Riverside to UCR)	High
	At-Grade	Industrial	(From UCR to March ARB)	Low

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: The visual impact assessment for alignment alternatives reflects on the compatibility with adjacent land uses (views of the project) and visual appeal for the user. However, it should be noted that frequently, the visual impact from the community's perspective is juxtaposed from that of the user. For instance, a tunnel may be very acceptable to the community to prevent cut/fill scars on the hillside, but the rider is in the dark and not able to take advantage of the terrain for vast viewshed opportunities. For screening purposes, the view of the train from the community's perspective was weighted higher value to avoid overly neutralizing visual impacts. A full description of the adjoining land uses is found in Section 4 (D) of this report and, therefore, the following highlights only a general description and those points of visual sensitivity for each alignment.

Screening for Alignment. Each alignment option was analyzed by rail construction type and primary landscape unit. The type of construction results in potential visual impacts such as cut and fill, aerial structures, water crossings, and loss of vegetation or urban development. The landscape unit communicates who the viewers will be, whether it is park users, residential units or commercial establishments. Considering these variables, each alignment has been broken into construction type, consisting of:

- At-grade
- Aerial
- Tunnel
- Urban grade-separated—aerial or depressed (trench)

For purposes of screening and in view of the length of this rail segment, the corridor is analyzed in segments of predominant landscape settings, as follows:

- Urban residential to high-density residential
- Urban commercial—retail and office land uses
- Urban industrial—light to heavy industrial uses
- Suburban residential—low density residential
- Center city or downtown environment—core business district of the community
- Open landscape—including natural terrain, community parks, and agricultural areas
- Special landscape features—historical significance, parks of particular significance, such as a state or national park

Visual Assessment Screening for Station Locations. For purposes of screening, the visual assessment of station locations is simply an evaluation of environmental context and the ability for a station location to incorporate design elements in order to blend into the environment. Station locations are categorized by scale and historical significance. Scale refers to the size of urban development blocks. Blocks can be small, medium, or large, often depending on the era in which they were developed. Urban design in older eras was a walkable scale; thus block sizes were smaller and more condensed. The visual impact of a high-speed train station within an area of small blocks is viewed as a high contrast, while an area that has been built with large urban blocks can more easily incorporate a station location. Historical significance refers to the presence of historical buildings and landmarks. For example, the Pomona Metrolink Station is a refurbished historic train station located near the traditional downtown commercial center. According to public responses, a high-speed train system at such a location would produce a high visual impact. The station locations were evaluated in terms of low, medium, and high compatibility to fit the scale and historical context of the surroundings.

Water Resources

The methodology established in Task 1.5.2[8] was utilized as a general guidance to identify the potential water resources that would be impacted by the proposed alignments. As a first step in the analysis, the *Environmental Summary Report* was reviewed to preliminarily list the water resources (water bodies) identified in the document that would potentially cross the proposed alignments and station locations and therefore be potentially impacted. In the next step, Thomas Guide maps were referenced to confirm the identity of the water bodies. Next, the project GIS database was utilized to further refine the list of water bodies by the hydrographic features.

The GIS database was supplemented with water quality data, where applicable, from the Regional Water Quality Control Plans (Basin Plans) to determine the potential for water quality degradation. The Basin Plan identifies beneficial uses for major water bodies or hydrological

[8] California High Speed Rail Authority (CHSRA) Task 1.5.2.report (March 23, 2001)

units. Some examples of beneficial use include municipal (MUN), Industrial (IND), Water Contact Recreation (REC1), WET (Wetland Habitat), WILD (wildlife habitat), etc. The designated beneficial uses were reviewed for the list of water bodies to determine the potential impacts to these uses, as a measure of potential water quality impairment.

A two-day “windshield” survey was also conducted to “ground truth” wetland resources potentially occurring along the proposed alignments. Information gathered from this field assessment was additionally utilized to further refine the analysis of potential water quality impairments.

The following are the sources of information utilized for the analysis:

- Previous project evaluations including Parsons Brinckerhoff (1996, 1999, 2000)
- Review of the hydrographic features from the project GIS database
- The Los Angles Water Quality Control (Basin) Plan, 1994
- Review of aerial photography
- Thomas Guides

Construction of all proposed alignments would result in some potential impairment to beneficial uses and thereby would result in some level of water quality impacts. Construction-related impacts to water quality would occur from: changes to topography, drainage patterns, devegetation, and increase in impermeable surfaces. These actions would result in increased runoff, erosion, and turbidity and pollutant loadings into the water bodies. Spills from vehicles and other chemicals related to construction would also result in water quality impairment.

The analysis focused on identifying channelized and unchannelized water resources within the right-of-way alignments under consideration or adjacent to the segments and station areas. The degree of impairment to beneficial uses of water bodies in urban settings, such as portions of Rio Hondo and the Los Angles River, is less severe than those located in nonurban areas (portions of Santa Ana River and San Luis Rey River). Based on the information gathered from the analysis described above, the following assumptions can be made to broadly differentiate the potential impacts to urban water resources from that of nonurban (natural) water resources occurring along the proposed alignments:

- Most of the urban water bodies are channelized. The channel bed and banks of these waterways are not as vulnerable as natural channels to erosion impacts from an increase in runoff, either during the construction or operational phase of the project. In addition, generally most of the urban water bodies identified are located in relatively flat topography, which reduces the potential for excessive runoff, erosion and subsequent degradation of water quality.

- Drainage patterns associated with most of the urban water resources are not natural due to severe hydromodifications. Therefore, disruption of natural drainage patterns is not anticipated with urban water resources.

- Most of the urban water bodies generally do not support sensitive beneficial uses such as wildlife and wetland habitats. Impermeable surfaces adjoining the channel banks and rapid conveyance of water generally preclude such water bodies from supporting wetland systems and wildlife habitat.

- Urban water bodies are generally assigned industrial and noncontact recreational uses. Temporary impacts to such uses as a result of the proposed project are not considered to be severe.

Potential impacts to water resources located in nonurban settings could create constraints to project implementation through requirements to avoid impacting such resources. However, even with such natural water resources, permanent impacts could, in most cases, be avoided by minor

adjustments to the alignment. In these situations, impacts were ranked as being slight or no apparent impact. In contrast, for some alignments, significant impacts to water quality appear to be unavoidable and are likely since the alignment traverses close to these resources and there are limited options for alternate alignment siting. One such constraint is the proposed alignment along SR-91 and the Santa Ana River.

In most circumstances, effective implementation of comprehensive Best Management Practices (BMPs) implemented through a Storm Water Pollution Prevention Plan (SW3P), required for a National Pollutant Discharge Elimination System (NPDES) Construction General Permit for the project, should greatly reduce the level of impairment to the impacted resources.

Parks and Recreation/Wildlife Refuge Impacts

The California HSR GIS database was not utilized or supplemented as part of this analysis. In order to identify and analyze the impacts to publicly owned parks, recreation areas, and preserves/wildlife refuges, the alignment and station alternatives were overlaid on maps from the following resources:

- Thomas Bros. Maps. *The Thomas Guide 2001: Los Angeles and Orange Counties*. 2000.[9]
- Thomas Bros. Maps. *The Thomas Guide 2001: San Bernardino and Riverside Counties*. 2000.[10]
- Thomas Bros. Maps. *The Thomas Guide 2001: San Diego County*. 2000.[11]

In addition to the Thomas Guides, United States Geologic Survey (USGS) maps and aerial photographs were analyzed.

Once the alignment and station locations were determined on the maps, parks, recreation areas, and preserves/wildlife refuges were identified within and along the right-of-way. The following criteria were used to assess the impacts of each alternative on parklands:

- Proximity to a park, recreational area, or preserve/wildlife refuge
- Size and type of area impacted
- Number of sites impacted

Intermodal Connections/Land Use Compatibility

The methodology employed was to examine land use data supplied from the Southern California Association of Governments (SCAG) to determine the existing and general plan land uses along a 0.25-mile (0.4 kilometer) buffer of each proposed route and within 0.25-mile (0.4 kilometer) of each proposed station. Also analyzed was the presence of sensitive land uses to determine the most feasible routes and station sites given prescribed criteria. The prescribed criteria were threefold: (1) maximize compatibility with existing and planned land uses, (2) minimize potential conflict with sensitive land uses, and (3) maximize intermodal connectivity. The first two criteria were applied to the rail alignments; all three were applied to stations. In assessing the applicability of these criteria, several measures were used as summarized in Table 2.2-4.

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[9] Thomas Bros. Maps. *The Thomas Guide 2001: Los Angeles and Orange Counties*. 2000

[10] Thomas Bros. Maps. *The Thomas Guide 2001: San Bernardino and Riverside Counties*. 2000.

[11] Thomas Bros. Maps. *The Thomas Guide 2001: San Diego County*. 2000.

Table 2.2-4
Criteria for Land Use Analysis

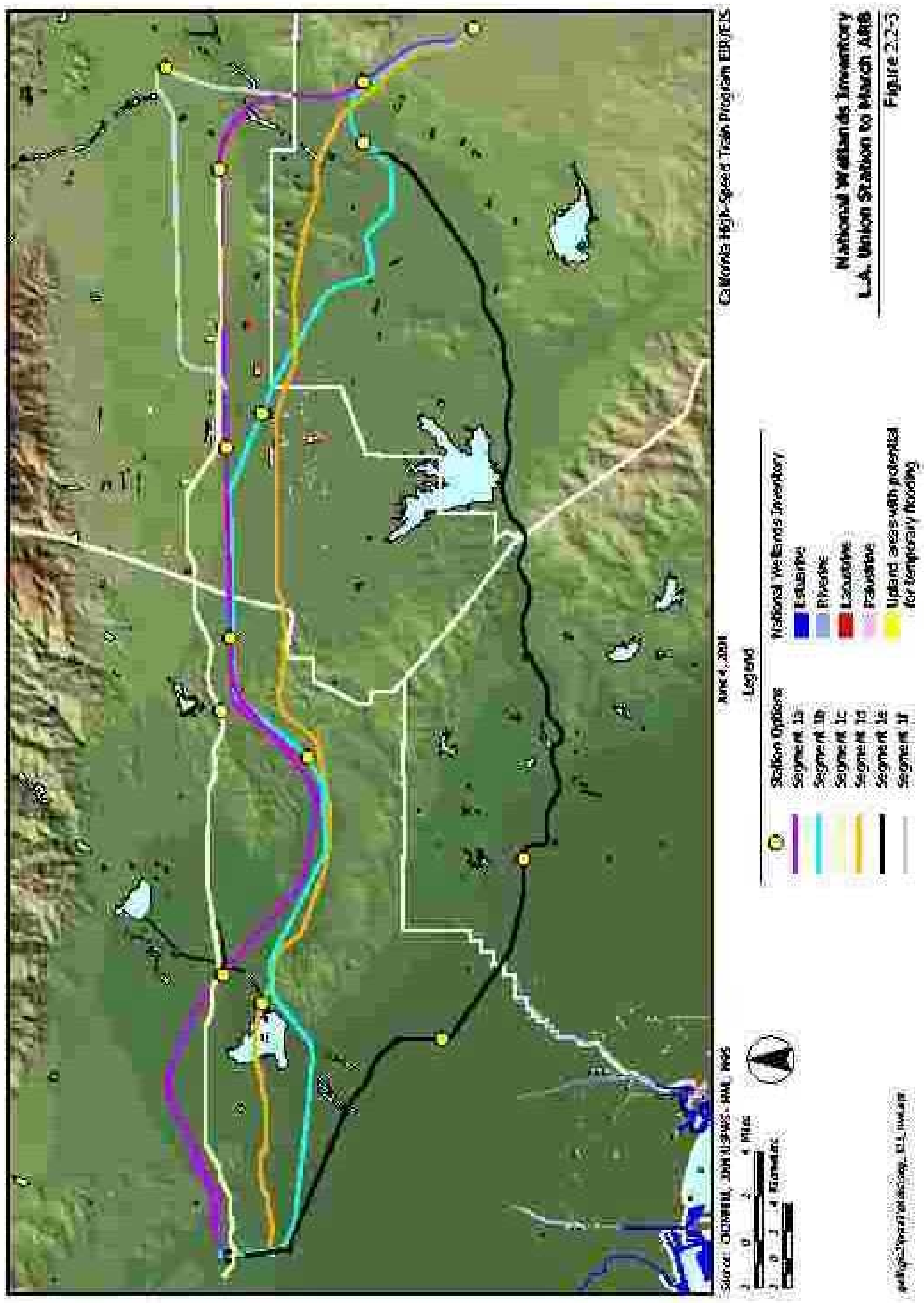
Criteria	Measures	Definitions	
1. Maximize Compatibility with Existing & Planned Land Uses	Land Uses	Mixed	No land use makes up more than 50% acreage
		Majority	One land use makes up more than 50% acreage
	Transition	Low	Less than 33% of land acreage will transition
		Medium	33 to 50% of land acreage will transition
		High	More than 50% of land acreage will transition
	Sensitive Uses	Noted as the presence of Parks/Recreation Area, Cultural Site, Hospital, Schools, Public Facilities, Cemetery, Regional Shopping Center, Military Base, Reservation, etc. within 0.25-mile of Alignment	
2. Minimize Conflict with Sensitive Land Uses	Environmental Justice	Low-Mod Income	More than 50% households earn less than 80% of mean family income
		High Minority	50% of pop is minority
		Both	Both a Low-Mod and high minority concentration
3. Maximize Intermodal Connectivity		Airports	Presence of site within 0.5-mile
		Transit	Presence of site within 0.5-mile
		Metrolink	Presence of site within 0.5-mile

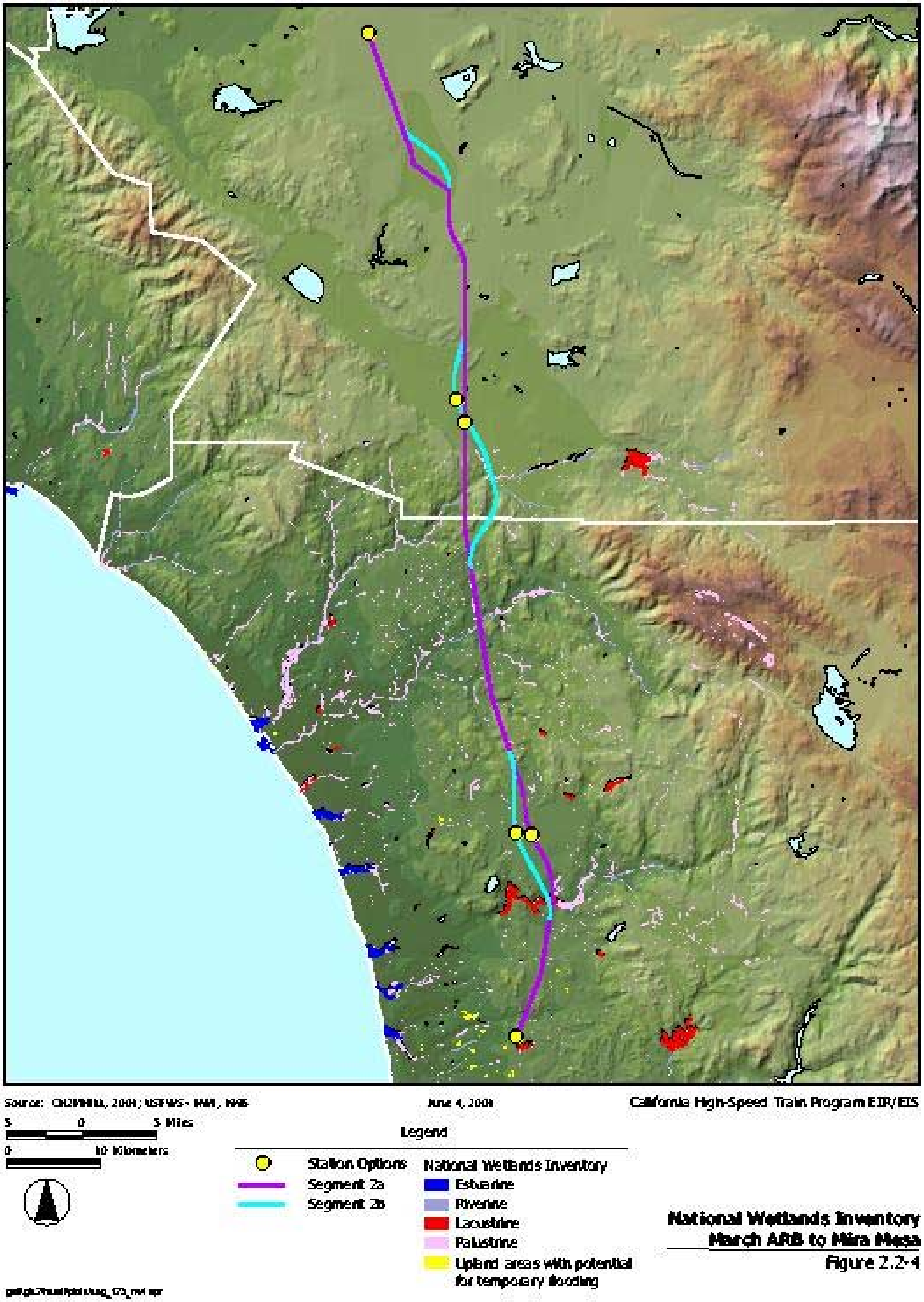
<u>Wetlands</u>

As a first step in the screening analysis, the methodology established in Task 1.5.2 was utilized as a general guidance to identify the potential wetland resources that the proposed alignments would impact. The *Environmental Summary Report*[12] also revealed information to further refine the scope of potential impacts to wetland resources. In the next step, CH2M HILL queried the National Wetlands Inventory (NWI) GIS database (Figures 2.2-3, 2.2-4, and 2.2-5). CH2M HILL performed a two-day "windshield" survey of the wetland resources potentially occurring along the proposed alignments to "ground truth" the wetland resources preliminarily identified as constraints because (a) the NWI maps are not entirely reliable sources of information as they do not reflect current field conditions and (b) the NWI database coverage provided for the analysis did not cover the entire project area. Relevant locations of wetlands were photographed and a few representative photographs are provided. See Figures 2.2-6 through 2.2-10.

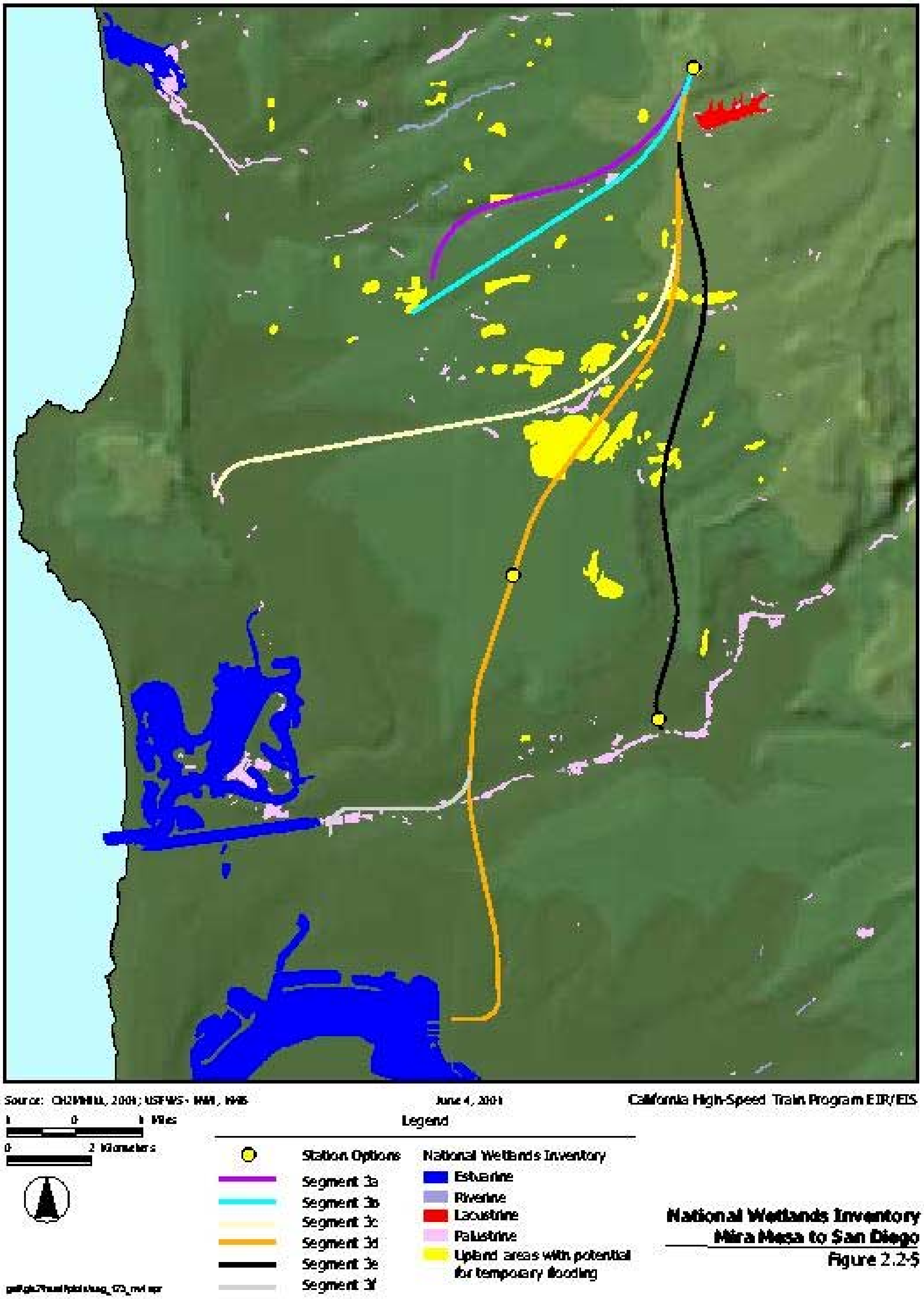
Vernal pools are not indicated on the NWI database. Therefore, prior to initiating the field survey, we reviewed relevant maps to obtain information about potential vernal pools occurring in the project area, particularly in western Riverside County (Figure 2.2-11) and in MCAS Miramar (Figure 2.2-12).

[12] (California HSR Authority, 2000)


California High-Speed Train Program EIR/EIS
June 4, 2001
Legend
Station Options
Segment 1a
Segment 1b
Segment 1c
Segment 1d
Segment 1e
Segment 1f
National Wetlands Inventory
Estuarine
Riverine
Lacustrine
Palustrine
Upland areas with potential for temporary flooding
Miles
Kilometers
National Wetlands Inventory
L.A. Union Station to March ARB
Figure 2.2-5



National Wetlands Inventory
March ARB to Mira Mesa
Figure 2.2-4



National Wetlands Inventory
Mira Mesa to San Diego
Figure 2.2-5

Figure 2.2-6
Riparian Habitat at San Luis Rey River, Off I-215

Figure 2.2-7
Marsh Wetland Habitat of San Dieguito River (Lake Hodges), Off I-215

Figure 2.2-8
Riparian Habitat Off San Clemente Canyon Road

Figure 2.2-9
Riparian Habitat of Santa Ana River Near Prado Basin, Off SR-91

Figure 2.2-10
Grasslands Off SR-91 in Riverside County,
Potential Vernal Pool Habitat and Habitat for Sensitive Flora and Fauna

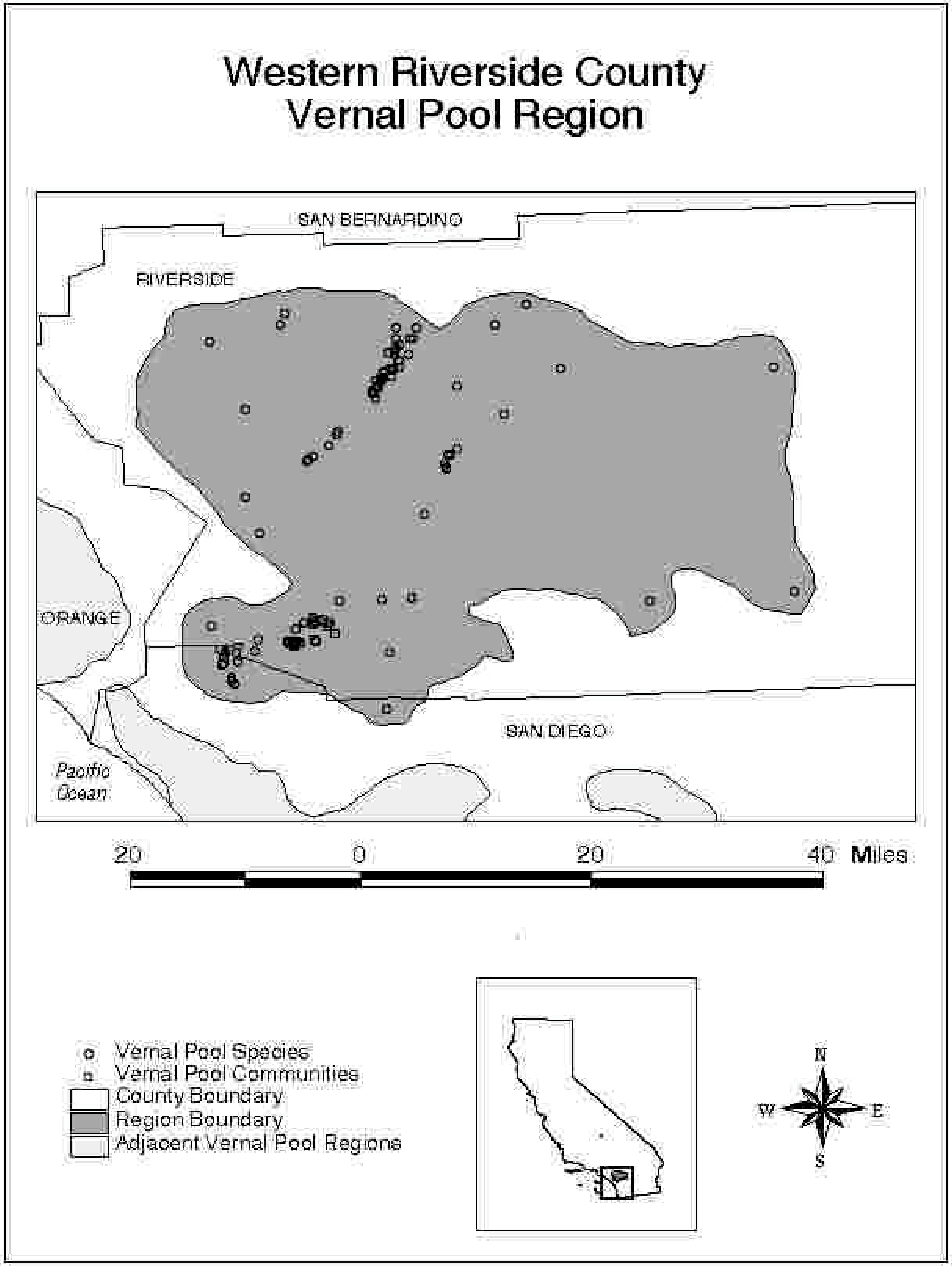

Western Riverside County
Vernal Pool Region
SAN BERNARDINO
RIVERSIDE
ORANGE
SAN DIEGO
Pacific Ocean
20
0
20
40
Miles
Vernal Pool Species
Vernal Pool Communities
County Boundary
Region Boundary
Adjacent Vernal Pool Regions
N
W
E
S

Figure 2.2-11

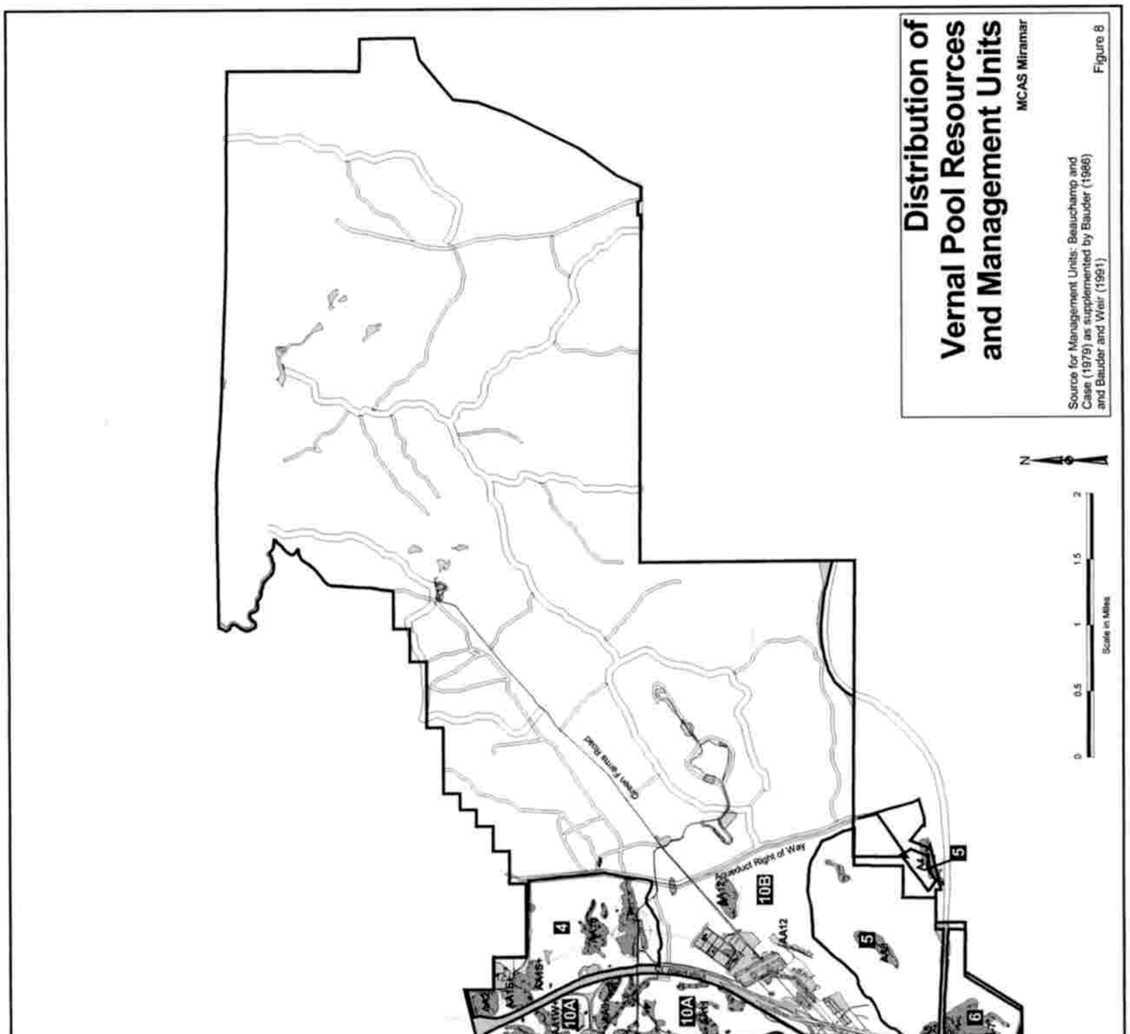

Distribution of Vernal Pool Resources and Management Units
MCAS Miramar
Source for Management Units: Beauchamp and Case (1979) as supplemented by Bauder (1986) and Bauder and Weir (1991)
Figure 8
Scale in Miles
Legend
Vernal Pool basin
Vernal Pool watershed
Developed Areas
Interstate 805

Figure 2.2-12

The following are the sources of information used in this screening evaluation:

- Previous project evaluations including Parsons-Brinckerhoff (1996[13], 1999[14], 2000[15])
- The California Natural Diversity Database (CNDDB)
- The California Department of Fish and Game (CDFG) Map of Vernal Pool locations in Western Riverside County[16]
- MCAS Miramar's Integrated Natural Resources Management Plan
- The Western Riverside County Multiple Species Habitat Conservation Plan (MSHCP) [17]
- Review of general plans for several cities
- Review of aerial photography

The analysis focused on identifying only natural wetlands resources (unchannelized wetlands) within the right-of-way alignments under consideration or directly adjacent to the segments and station areas. These natural wetlands include riparian wetlands (associated with rivers, streams, creeks, etc.), vernal pools, and freshwater marsh habitats. Potential impacts to these habitats could create constraints to project implementation through requirements to avoid habitat or requirements for special mitigation or coordination with resource agencies.

Proximity of the alignment or station to the resource (i.e., potential habitat and/or known locations) and the sensitivity of the resource were the bases for determining the potential for impact. In many cases direct impacts easily could be avoided since habitat is not close to the alignment or minor adjustments to the alignment could avoid direct impacts. In these situations, impacts were ranked as being slight or no apparent impact. In contrast, for some alignments, direct impacts appear to be unavoidable and are likely to be significant since the alignment traverses high-value habitat occupied by sensitive, protected species of flora and fauna. In such circumstances, there is little opportunity for avoidance and limited options for mitigation.

<u>Floodplains</u>

The methodology established in Task 1.5.2 was utilized as a general guidance to identify floodplain crossings that potentially would be impacted by the proposed alignments. As a first step in the analysis, the *Environmental Summary Report*[18] was reviewed to preliminarily list the floodplain crossings. In the next step of the analysis, the project GIS database was utilized to determine the degree of impacts or encroachment into the floodplain for each proposed alignment, by using the floodplain attributes of the database. By definition, any construction activity (access roads, cut and fill, slope protection, etc.) within a base floodplain (the area subject to flooding by the base flood or a 100-year floodplain) is considered to be encroachment. By definition, a significant floodplain encroachment is defined in 23 Code of Federal Regulations (CFR) FR 650 subpart A, as an encroachment that would either interrupt emergency vehicles or evacuation routes, pose a significant risk, or create a significant adverse impact on natural and beneficial floodplain values during and following construction.

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[13] Parsons-Brinckerhoff. *California High-Speed Rail Corridor Evaluation and Environmental Constraints Analysis*. California Intercity High-Speed Rail Commission, June 1996.

[14] Parsons-Brinckerhoff. *California High-Speed Rail Corridor Evaluation*. Prepared for California High-Speed Rail Authority, December 1999.

[15] Parsons-Brinckerhoff. *California High-Speed Rail Corridor Evaluation - Environmental Summary*. Prepared for California High-Speed Rail Authority, April 2000.

[16] Western Riverside County Vernal Pool Region, http://maphost.dfg.ca.gov/wetlands/. Site accessed May 29, 2001

[17] Western Riverside County Multiple Species Habitat Conservation Plan, http://ecoregion.ucr.edu/. Site accessed May 29, 2001.

[18] (CHSRA, 2000)

The attributes of beneficial floodplain values, as defined by the Federal Highways Program Manual (FHPM) include, but are not limited to: wildlife, plants, wetlands, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, forestry, natural moderation of floods, water quality maintenance, and groundwater recharge.

Based on the review of information and screening analysis, a general conclusion is made that construction of any of the proposed alignments would not result in emergency vehicle routes being hindered during construction or flooding. Further, the proposed project would not result in any significant new risks during construction or flooding, because the proposed high-speed train facility, for the most part, is above grade or in tunnel and, therefore, would result in Minimal increase in base flow; although this would depend on footing size and floodplain.

For this screening analysis, therefore, the proposed alignments were either identified as major (or significant) floodplain encroachment (high constraints) or minor floodplain encroachment (low constraints) based on the following criteria:

- Proposed alignments within the base floodplain with potential to impact natural and beneficial floodplain values.
- Proposed alignments located in Flood Zone A (The Federal Emergency Management Agency [FEMA] identifies projects located within Zone A [designated on the Flood Insurance Rate Maps or FIRMS] as potentially resulting in a higher degree of impact to the base floodplain and thereby resulting in impacts to the beneficial floodplain values.
- Proposed alignments resulting in a longitudinal encroachment (parallel to the floodplain) are identified as minor encroachment as opposed to a transverse encroachment (perpendicular to and crossing the floodplain). Longitudinal encroachments generally result in greater impacts to floodplain by virtue of their greater surface area of encroachment.
- Proposed alignments located within a flood zone designated as X were identified to be a minor encroachment (By definition, an alignment located in Zone X is anticipated to have minimum impact on the base floodplain and thereby would not substantially result in degradation of floodplain values.)

The following are the sources of information used for the analysis:

- Previous project evaluations including Parsons Brinckerhoff (1996[19], 1999[20], 2000[21])
- Review of the hydrographic features from the project GIS database
- Review of the FEMA Flood Insurance Rate Maps-Flood Zone Classification (GIS Database)
- Review of Aerial Photography
- Thomas Guides

<u>Threatened and Endangered Species</u>

The screening methodology for plant and animal species of special concern followed that established by Task 1.5.2. The analysis focused on identifying federally and state listed threatened and endangered species within the right-of-way or directly adjacent to the alignments and station areas, primarily using the GIS California Natural Diversity Database (CNDDB) (Figures 2.2-10, 2.2-11, and 2.2-12). Impacts to these species and their habitats could create constraints

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19 Parsons-Brinckerhoff. *California High-Speed Rail Corridor Evaluation and Environmental Constraints Analysis*. California Intercity High-Speed Rail Commission, June 1996.

20 Parsons-Brinckerhoff. *California High-Speed Rail Corridor Evaluation*. Prepared for California High-Speed Rail Authority, December 1999.

21 Parsons-Brinckerhoff. *California High-Speed Rail Corridor Evaluation - Environmental Summary*. Prepared for California High-Speed Rail Authority, April 2000.

to project implementation through requirements to avoid habitat or requirements for special mitigation or coordination with resource agencies.

The potential for impact was based on proximity of the alignment or station to the resource (i.e., potential habitat and/or known locations) and the sensitivity of the resource. In many cases, direct impacts easily could be avoided since habitat is not close to the alignment and minor adjustments to the alignment could avoid direct impacts. In these situations, impacts were ranked as being slight or no apparent impact. In contrast, for some alignments, direct impacts appear to be unavoidable and are likely to be significant since the alignment traverses high-value habitat occupied by protected species. In these circumstances, there is little opportunity for avoidance and limited options for mitigation. The full extent of this wont really be known until detailed surveys are conducted in the future.

Information sources used in this screening evaluation:

- Previous project evaluations including Parsons Brinckerhoff (1996[22], 1999[23], 2000[24])
- The California Natural Diversity Database (CNDDB)
- 2-day windshield survey of project area
- Integrated Natural Resources Management Plan for MCAS Miramar[25]
- The Western Riverside County Multiple Species Habitat Conservation Plan[26]
- Multiple Species Conservation Program for the City of San Diego
- Habitat Conservation Plan for the Stephens' Kangaroo Rat
- Review of General Plans for several cities
- Review of aerial photography

<u>Cultural Resources Impacts</u>

This analysis of potential project impacts to cultural resources was based on National Park Service (NPS) National Register site GIS database materials that included both mapping (Babel) and associated database files that list the names, addresses, and other pertinent information pertaining to known/recorded cultural resources. The database information includes historic properties actually listed in the National Register of Historic Places and also properties determined eligible for listing in the National Register. Each historic property listed in the database is given a "Reference Number" and the applicable Reference Numbers are used in the evaluation summary tables to designate the historic properties that are potentially impacted.

The GIS mapping was examined in conjunction with examination of the USGS base topographic maps with the alignment and station options superimposed. The methodology in Task 1.5.2 required that 50-foot (15.2-meter)-wide corridors (in urbanized/developed areas) and 100-foot (30.4-meter)-wide corridors (in less developed areas or areas where a large cut/fill might be needed) be screened for the presence/absence of historic properties.

Historic buildings/districts can be subject to adverse visual effects if a proposed aerial structure alters existing historic setting. Proposed high-speed train structures that would be visible from an entrance to a historic building could jeopardize the historic integrity of the building/ district's setting. Figures 2.2-13, 2.2-14, and 2.2-15 show the proximity of National Register sites to the proposed station options.

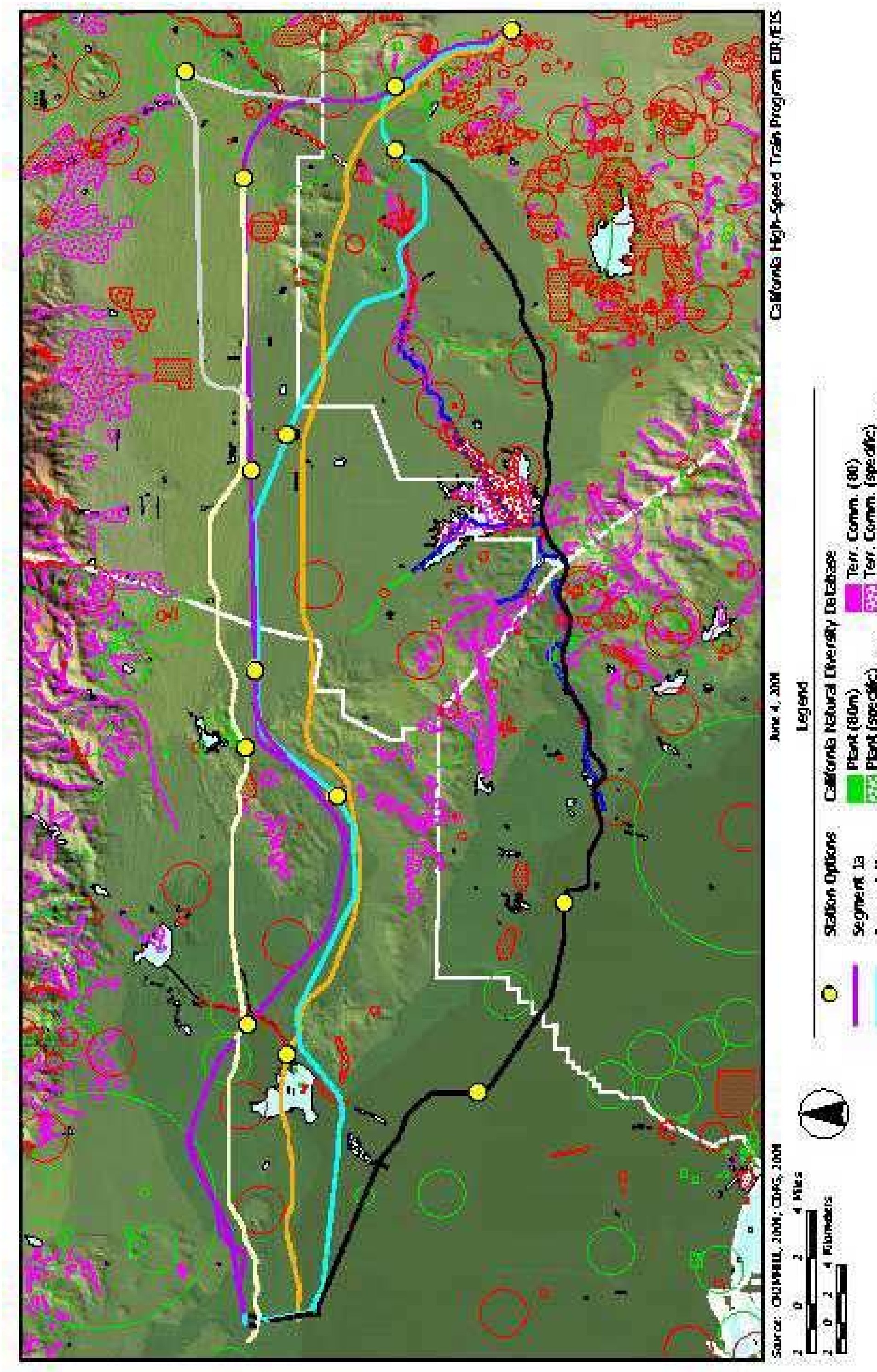
22 Parsons-Brinckerhoff. *California High-Speed Rail Corridor Evaluation and Environmental Constraints Analysis*. California Intercity High-Speed Rail Commission, June 1996.

23 Parsons-Brinckerhoff. *California High-Speed Rail Corridor Evaluation*. Prepared for California High-Speed Rail Authority, December 1999.

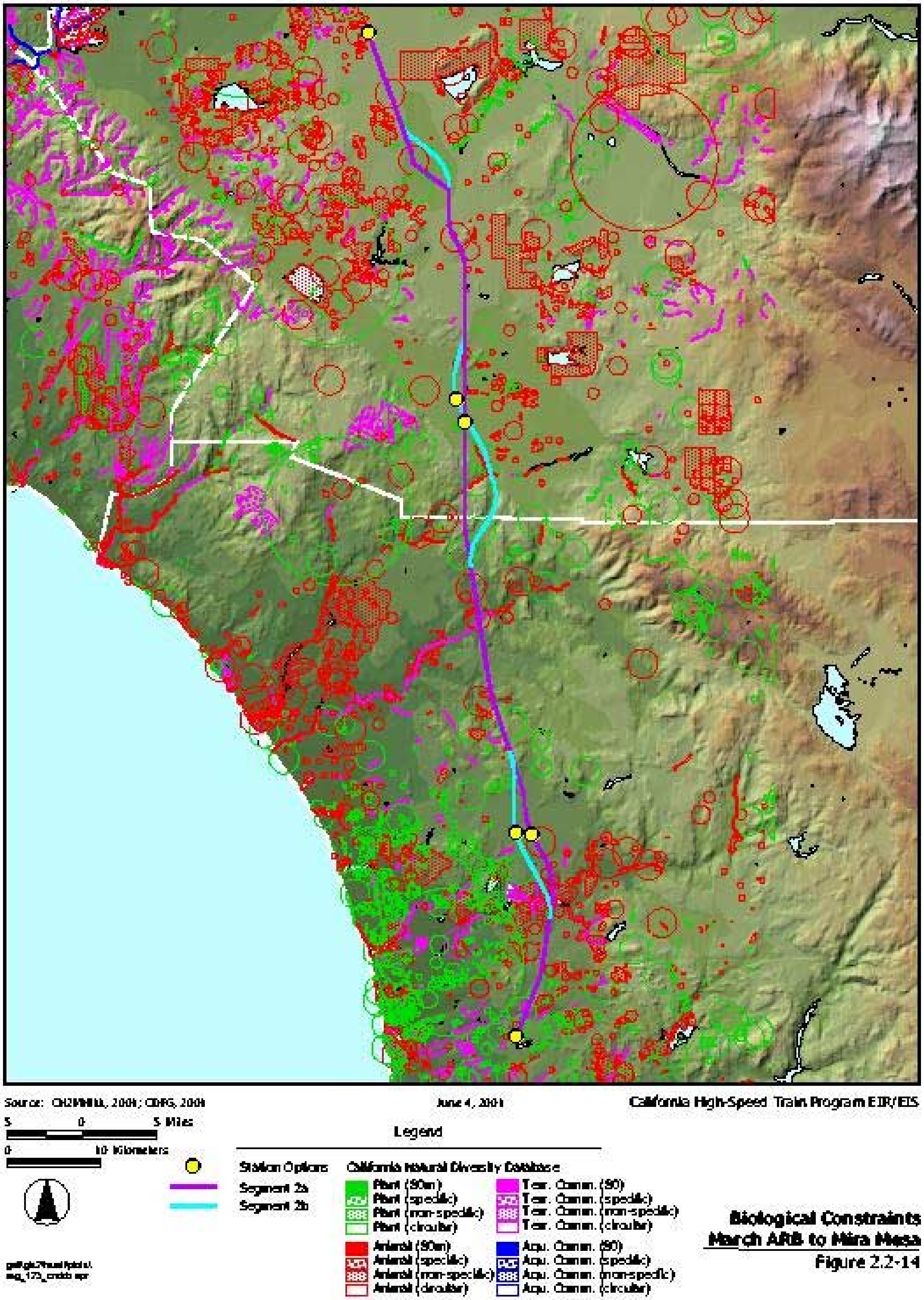
24 Parsons-Brinckerhoff. *California High-Speed Rail Corridor Evaluation - Environmental Summary*. Prepared for California High-Speed Rail Authority, April 2000.

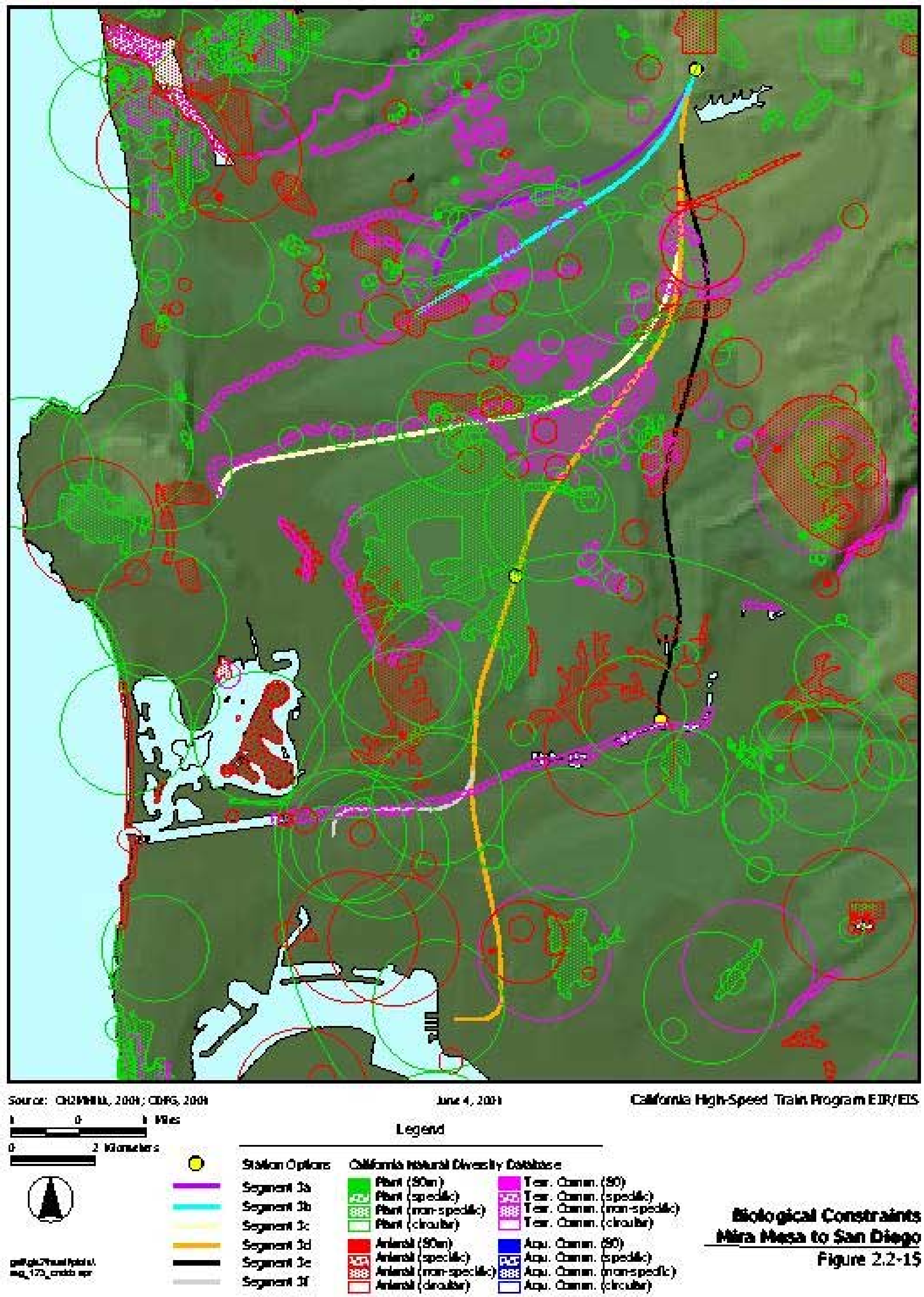
25 Dames & Moore. *Integrated Natural Resources Management Plan*. Prepared for Marine Corps Air Station Miramar, May 2000.

26 Western Riverside County Multiple Species Habitat Conservation Plan, http://ecoregion.ucr.edu/. Site accessed May 29, 2001.



Biological Constraints
L.A. Union Station to March ARB
Figure 2.2-13


Source: CH2MHill, 2001; CDFG, 2001
June 4, 2001
California High-Speed Train Program EIR/EIS
5 0 5 Miles
0 10 Kilometers
Legend
Station Options
Segment 2a
Segment 2b
California Natural Diversity Database
Plant (80m)
Plant (specific)
Plant (non-specific)
Plant (circular)
Animal (80m)
Animal (specific)
Animal (non-specific)
Animal (circular)
Terr. Comm. (80)
Terr. Comm. (specific)
Terr. Comm. (non-specific)
Terr. Comm. (circular)
Aqu. Comm. (80)
Aqu. Comm. (specific)
Aqu. Comm. (non-specific)
Aqu. Comm. (circular)
Biological Constraints
March ARB to Mira Mesa
Figure 2.2-14



Biological Constraints
Mira Mesa to San Diego
Figure 2.2-15

Soils/Slope Constraints

The analysis of the geologic and soil constraints was based on GIS mapping and other pertinent information pertaining to known/recorded geologic and soils information including the Geologic Map of California (Los Angeles, San Bernardino, Santa Ana, and San Diego), the Fault Map of California, the State of California Seismic Hazard Zones maps, and various USGS 7.5-minute quadrangle maps.

The geologic and soils constraints will play a significant role in construction of the high-speed train system; therefore, it is necessary that further investigation be performed in the future. This initial investigation gives an indication of the geologic setting, the potential landslides, and the type of slope that can be used in construction of the proposed alignments.

Seismic Constraints

The analysis of the seismic constraints was based on GIS mapping and other information pertaining to known/recorded geologic and soils information including the Geologic Map of California (Los Angeles, San Bernardino, Santa Ana, and San Diego), the Fault Map of California, the State of California Seismic Hazard Zones maps, the 1997 Uniform Building Code (UBC), and various USGS 7.5-minute quadrangle maps.

The seismic constraints will play a significant role in construction of the high-speed train system, therefore it is necessary that further investigation be performed in the future. This initial investigation gives an indication as to any encountered faults or fault zones and the potential for liquefaction.

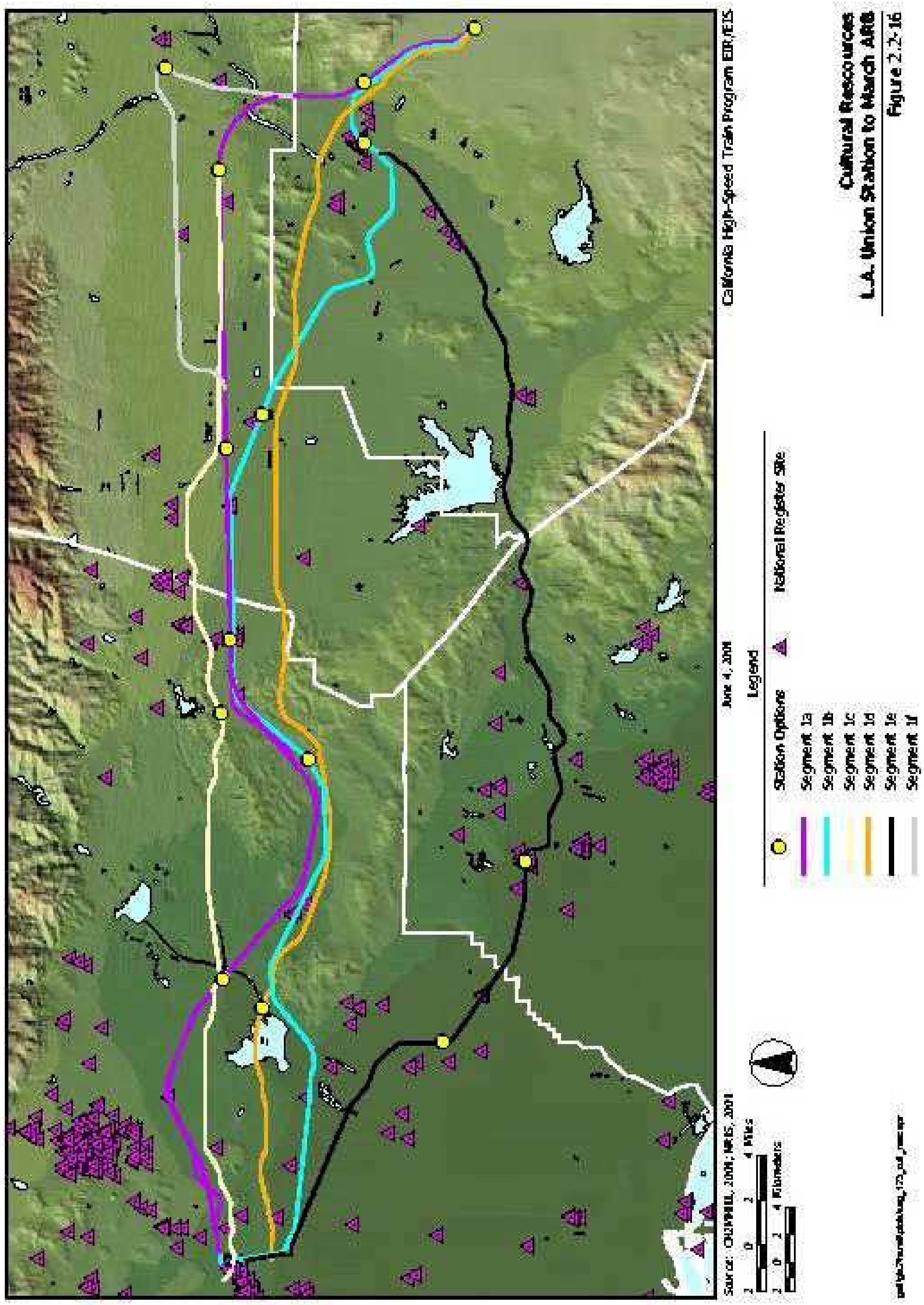
Hazardous Materials/Waste Constraints

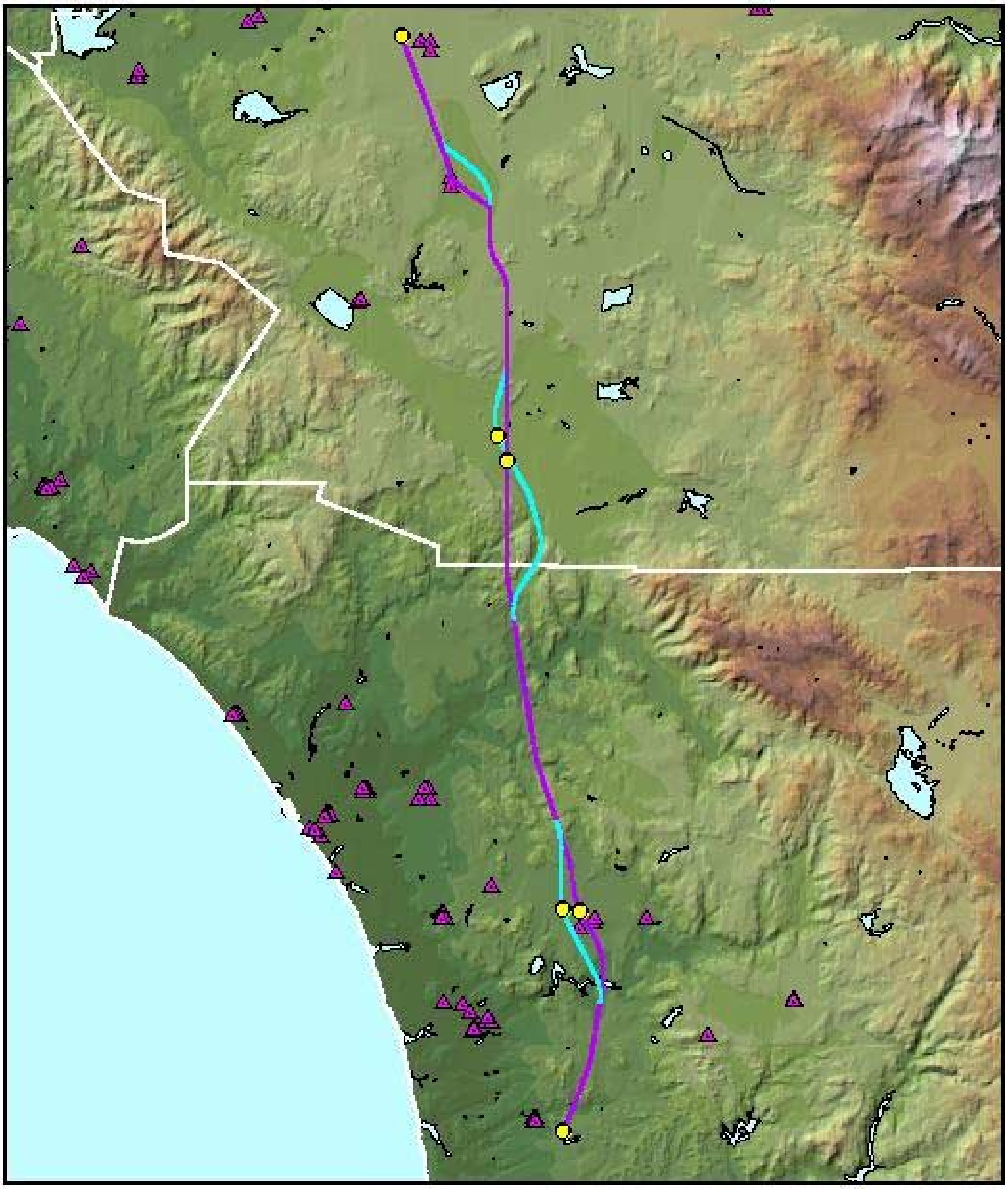
Task 1.5.2 was used to identify potential hazardous waste sites that may impact the high-speed train alignment and station options. Alignment options were scanned for hazardous waste sites based on the corridor widths described in the screening methodology document. The same widths were used to screen station locations.

For each site identified within the alignment right-of-way, the GIS database entry was reviewed to assess the general nature of the site and develop an opinion of the potential impact of the site to the alignment (Figures 2.2-16, 2.2-17, and 2.2-18). The sites were generally grouped as: hazardous waste generators, hazardous waste transporters, or sites that were involved in some form of hazardous waste release where an agency file exists. For reporting purposes, sites were grouped and the number of sites in each group were reported for each option. In addition, the summary tables list sites where no further action was required or sites where the database suggests that significant hazardous waste issues may exist.

Alignment and station options were ranked in terms of potential constraints based on the number and types of sites that were encountered as well as the presence of any sites that may have significant hazardous waste issues based on the GIS database. The rankings were assigned based on a qualitative assessment of potential constraints, using the reported hazardous waste sites as indicators.

Hazardous waste release sites and transporter sites were given greater significance than generator sites.


California High-Speed Train Program EIR/EIS
June 4, 2004
Legend
Station Options
Segment 1a
Segment 1b
Segment 1c
Segment 1d
Segment 1e
Segment 1f
National Register Site
Miles
Kilometers
Cultural Resources
L.A. Union Station to March ARB
Figure 2.2-16



Source: CH2MHill, 2001; NRIS, 2001

June 4, 2001

California High-Speed Train Program EIR/EIS

5 0 5 Miles

0 10 Kilometers

Legend

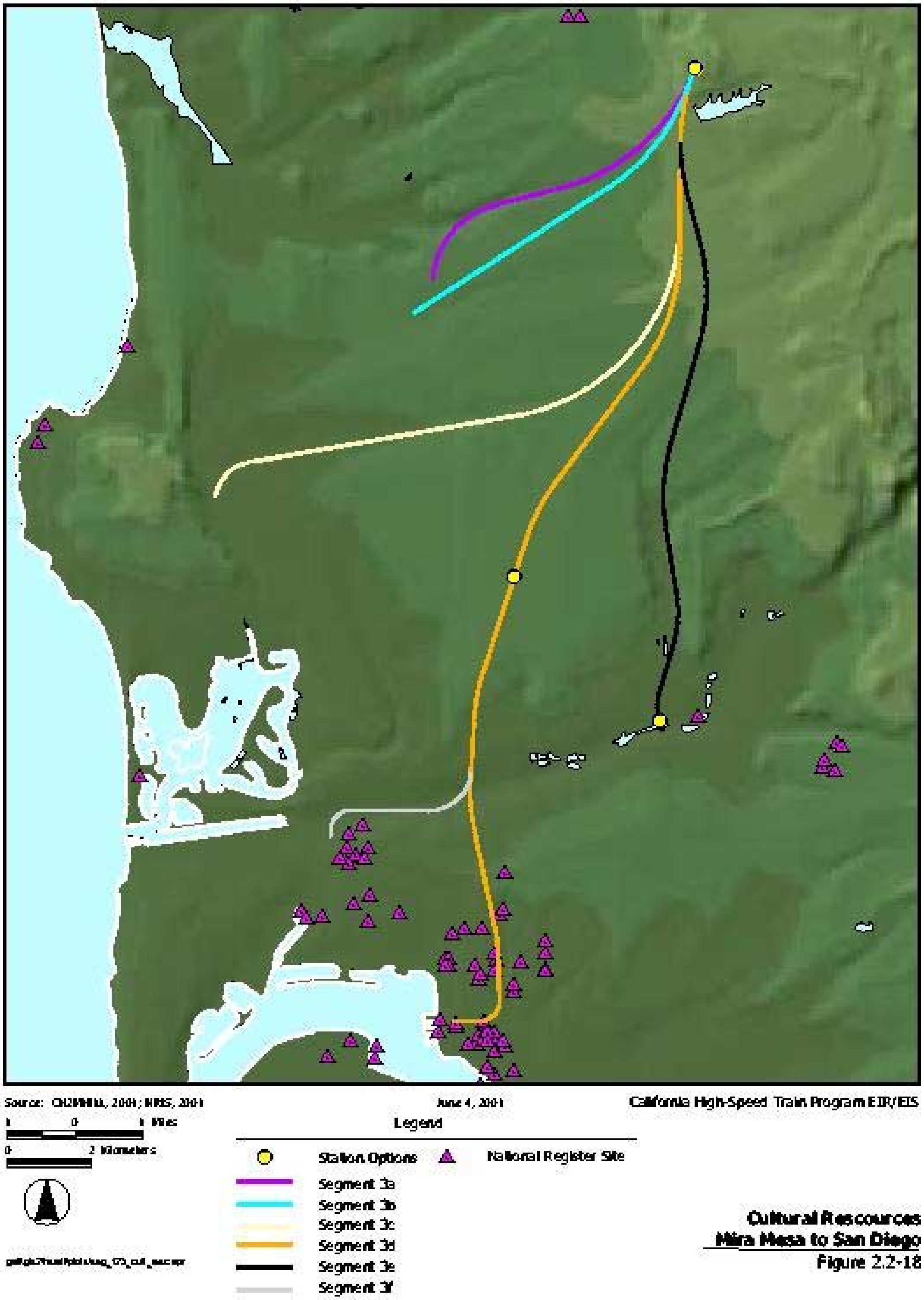
Station Options

National Register Site

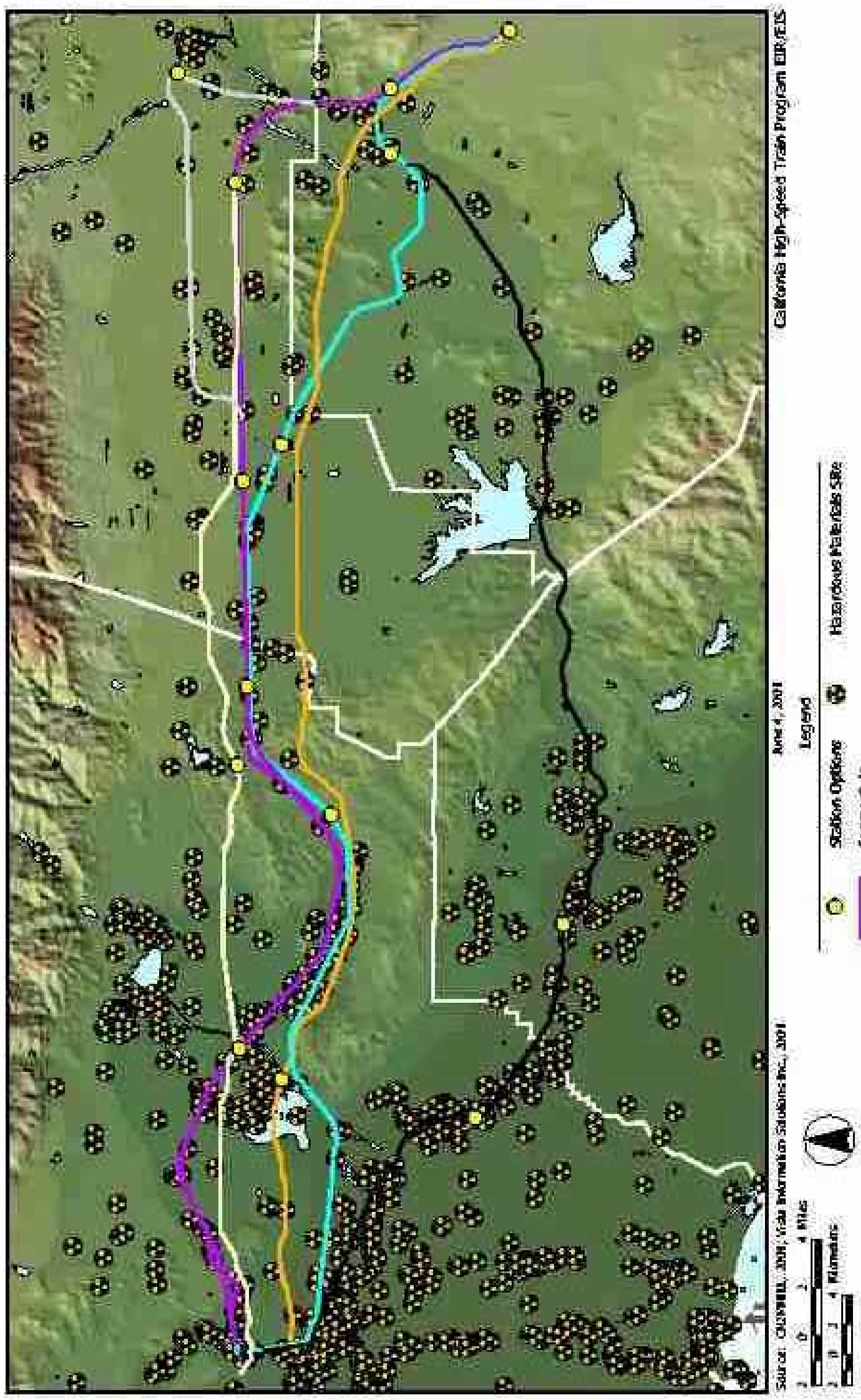
Segment 2a

Segment 2b

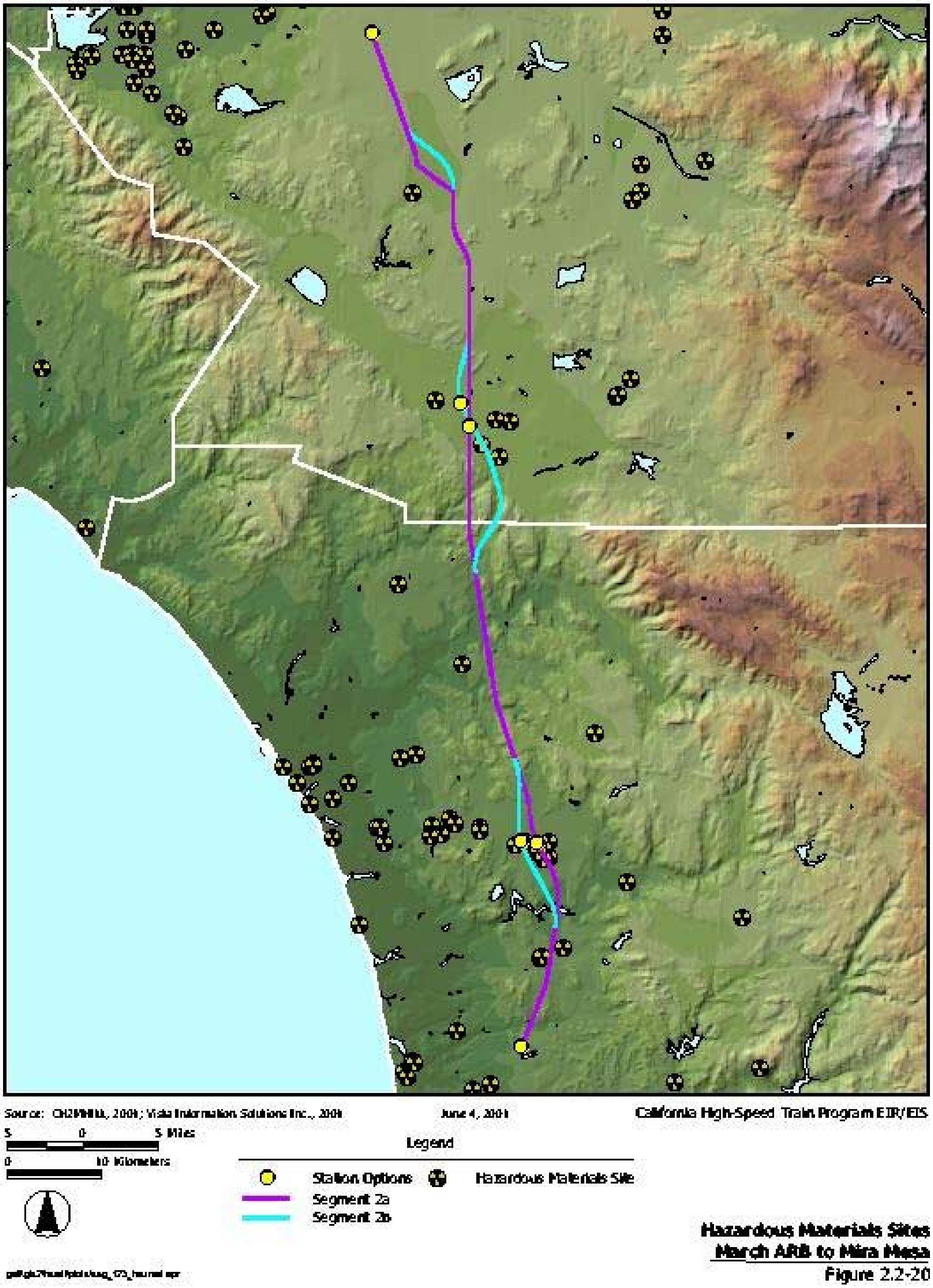
Cultural Resources
March ARB to Mira Mesa
Figure 2.2-17



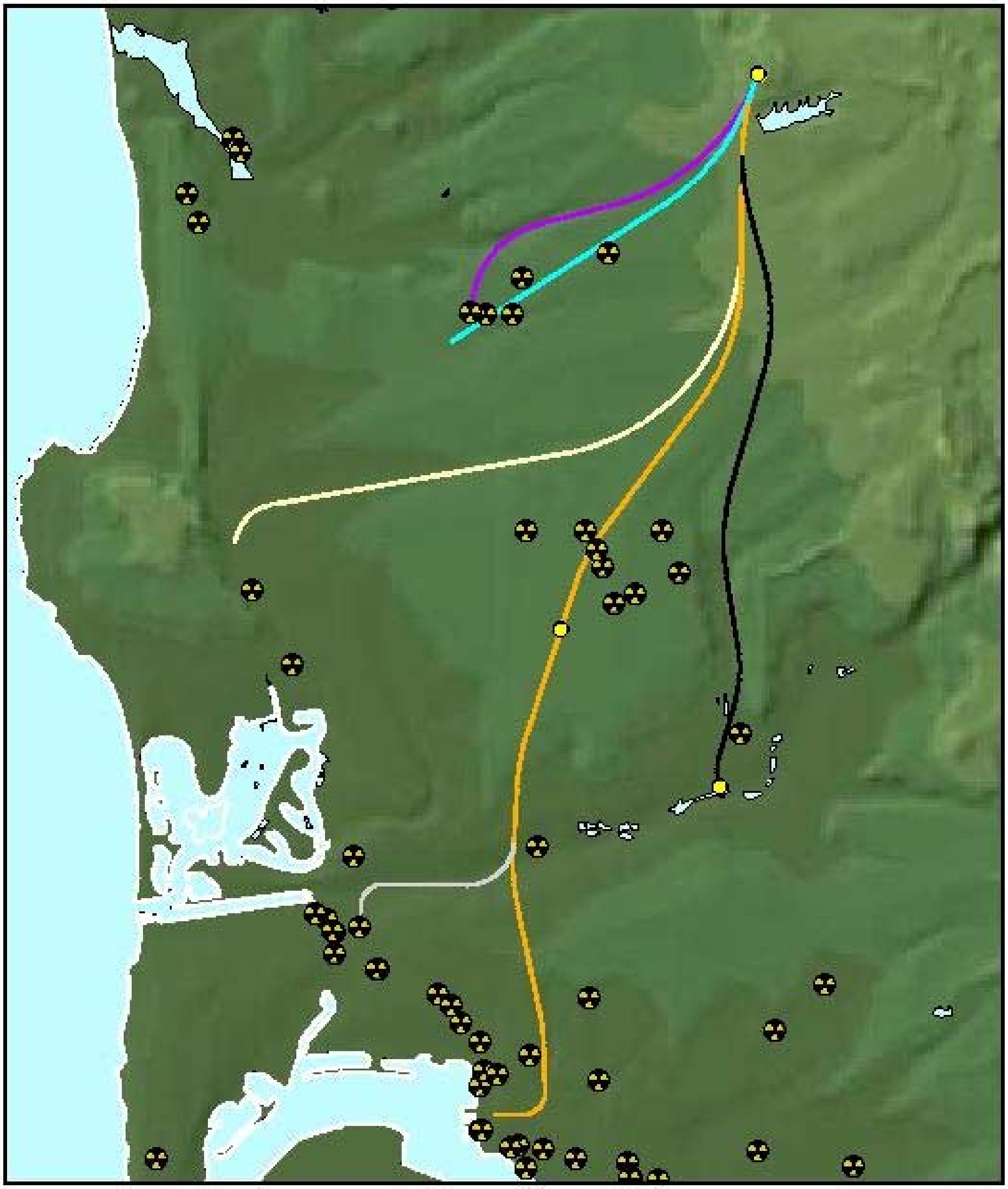
Cultural Resources
Mira Mesa to San Diego
Figure 2.2-18



Hazardous Materials Sites
L.A. Union Station to March ARB
Figure 2.2-13



Hazardous Materials Sites
March ARB to Mira Mesa
Figure 2.2-20



Source: CH2MHILL, 2001; Vista Information Solutions Inc., 2001

June 4, 2001

California High-Speed Train Program EIR/EIS

Hazardous Materials Sites
Mira Mesa to San Diego
Figure 2.2-21

3.0 ALIGNMENT AND STATION DEFINITION

This chapter provides a discussion of the relationship between the current Program EIR/EIS process and the previous planning efforts for the high-speed train program undertaken by the California High-Speed Rail Authority. A description of each alignment and station options, including alignments and stations carried over from the previous work as well as new alignments and stations that have been added during the current phase, are defined.

The alignment and station options in the Los Angeles-to-San Diego-via-the-Inland Empire Corridor are generally an outgrowth and continuation of the work done previously by the Authority and its predecessor, the California High-Speed Rail Commission (Commission), over the past four to five years.

Those studies identified corridors that could be available to develop the infrastructure necessary to develop a high-speed train system that conforms to a predefined set of criteria regarding service levels, travel times, access, and convenience.

To address the question of feasibility, the Commission conducted a series of technical studies encompassing ridership and revenue forecasts, economic impact and benefit-cost analyses, institutional and financing options, corridor evaluation and environmental constraint analysis, and preliminary engineering feasibility studies. Based on these studies, the Commission determined that HSR is technically, environmentally, and economically feasible and set forth recommendations for the technology, corridors, financing, and operation of the system.

In 1999 the Authority completed the *California High-Speed Rail Corridor Evaluation*[27], which forms the basis for the current work effort for the Program EIR/EIS. This report sets forth the basic system assumptions and parameters, provides a regional corridor evaluation, and overall corridor comparison. Also, it includes the development of operating strategy and implementation issues that must be considered. In June 2000, the Authority produced *Building a High-Speed Train System for California, Final Business Plan*[28]. This report outlined the broad focus and strategy for developing California's high-speed train system and laid out the necessary steps for moving the project forward to completion by the year 2020. Figure 3.0-1 identifies the alignments and stations discussed in the following sections.

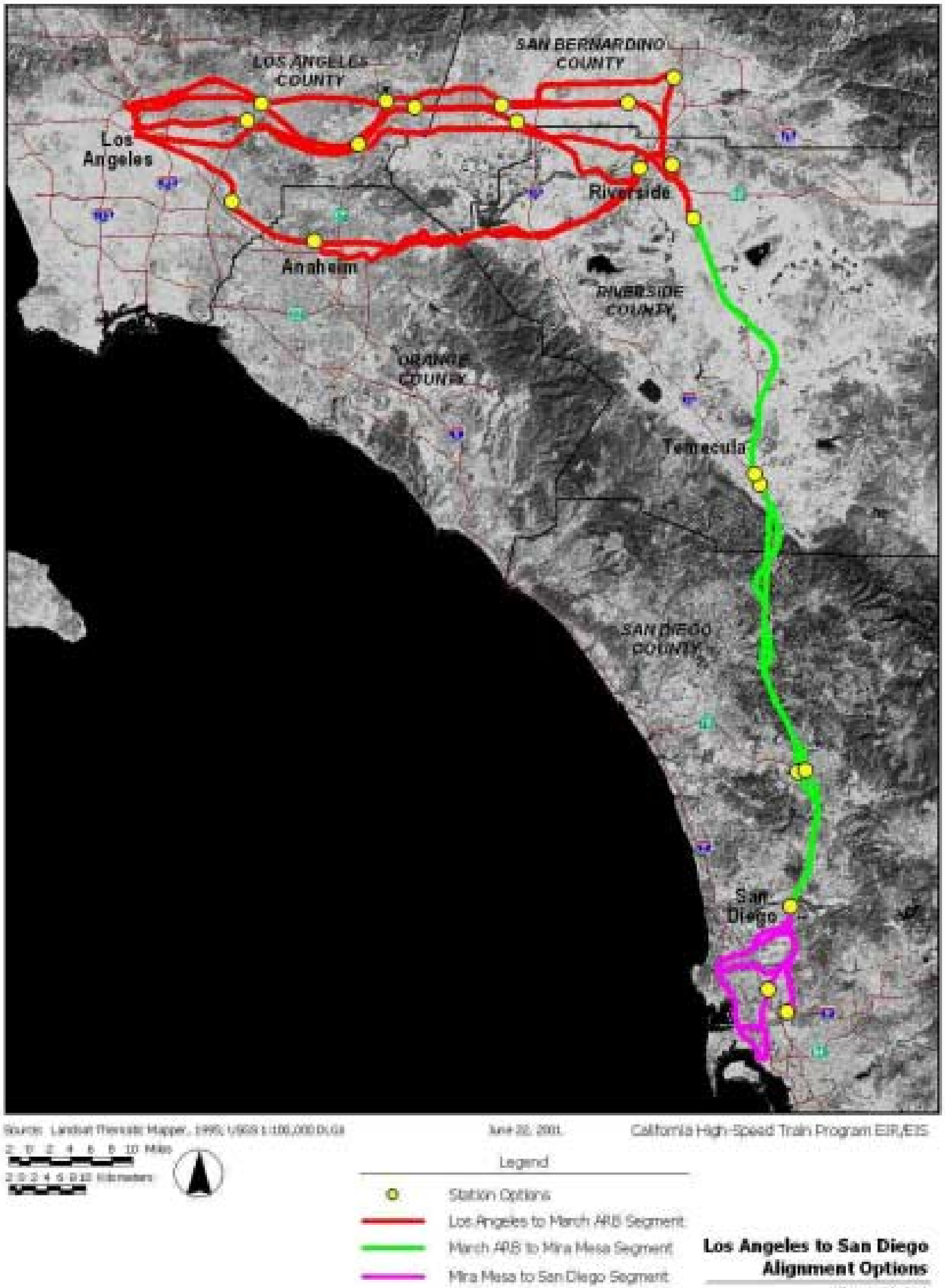
The Los Angeles-to-San Diego-via-the-Inland Empire corridor is divided into three segments for analysis purposes. These segments are organized according to the changes in geography, topography, and urban form that occur along the routes and that may require different construction and system development assumptions. These three segments are Los Angeles to March ARB (Segment 1), March ARB to Mira Mesa (Segment 2), and Mira Mesa to San Diego (Segment 3).

3.1 PREVIOUS ALIGNMENT AND STATION OPTIONS STUDIED

The previous work identified the following alignment options that have been included in this phase of the work for further study. The segment names and numbers have been assigned to remain consistent with a general pattern traveling north to south and west to east. These alignment and station options were selected with the intent of achieving the travel time and ridership targets outlined in the previous technical studies and have been included in the Authority's *Business Plan* as a starting point. The *Business Plan* identifies the need for establishing a baseline route and alignment that meets the needs of the program and that can be carried forward into the environmental analysis phase where additional alignments will be investigated (current focus of work).

[27] Parsons Brinckerhoff. *California High-Speed Rail Corridor Evaluation*. Prepared for California High-Speed Rail Authority, December 1999.

[28] California High-Speed Rail Authority. *Building a High-Speed Train System for California, Final Business Plan*. June 2000.



Los Angeles to San Diego Alignment Options

Figure 3.0-1

3.1.1 Segment 1: Los Angeles Union Station-to-March Air Reserve Base (Figure 3.1-1)

- Alignment 1.g - LA Union Station-to-March Air Reserve Base (ARB)-via-Union Pacific (UP)/Metrolink and Up/Colton Rail Corridors
- Alignment 1.e - Union Station-to-March ARB-via-Burlington Northern Santa Fe (BNSF)/State Route 91 (SR-91) Rail/Freeway Corridor (This alignment includes two variations, the rail-only alignment and a hybrid alignment that uses both the BNSF railroad and the SR-91 freeway.)

The station locations previously studied that have been included in this phase for further study follow.

- Norwalk Metrolink Station - This station has connectivity to the regional metro rail system at the Norwalk Green Line Station that will require a local bus feeder connection.

- Fullerton Transit Center Metrolink Station, also Amtrak - This station is an existing regional transportation center and has good linkages to transit and other modes.

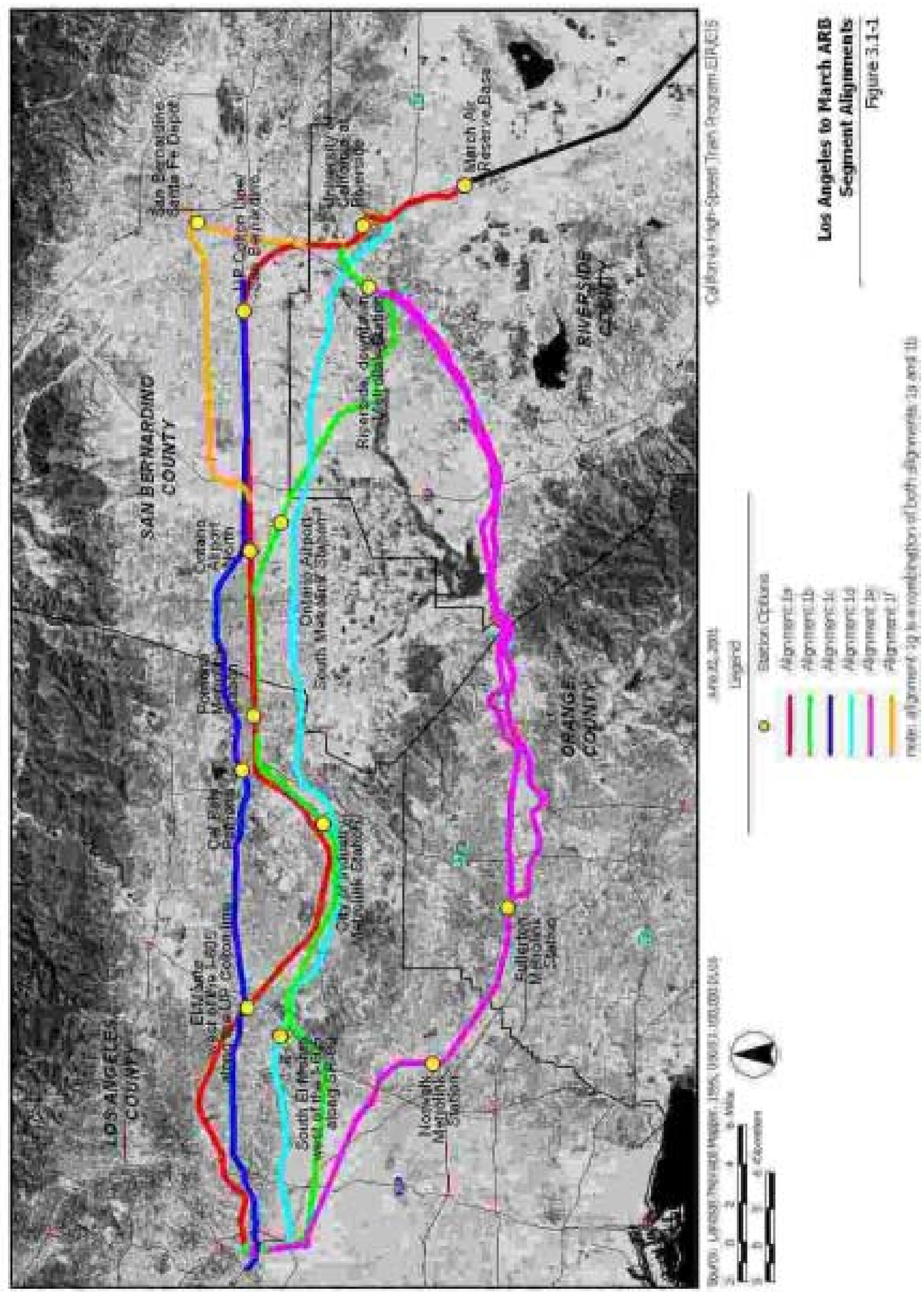
- Pomona Metrolink Station - The Pomona Metrolink Station allows a multimodal transfer station with Metrolink and local busses at an existing historic station site. The station is on the edge of the downtown area and has reasonable access. Historic stations offer both plusses and minuses.

- Ontario Airport North Station - A station here provides a multimodal connection with the Ontario International Airport. The station site includes some land that is currently vacant.

- Riverside, Downtown Metrolink Station - This station presents the opportunity to make use of an existing historic station. It is an existing Metrolink station located near the downtown area and has relatively good access, but it may require some sacrifice in travel times in order to serve this location.

- University of California at Riverside - The existing right-of-way runs through this area and a new station site could be developed here. There are potential impacts with the campus and nearby residential areas.

- March Air Reserve Base - This site is outside the city of Riverside and a station here would be a newly developed facility. As March ARB is redeveloped, a station site in this area could serve some of the planned development.



Los Angeles to March ARB Segment Alignments

Figure 3.1-1

3.1.2 Segment 2: March ARB-to-Mira Mesa (Figure 3.1-2)

- Alignment 2.b - Interstate Highway (I)-215/I-15 freeway corridor

The station locations previously studied that have been included in this phase for further study follow.

- Temecula at the I-15/215 Wye - The Temecula area on the I-215/I-15 route from Riverside to San Diego has long been identified as an important location for an Inland Empire station due to the growth and development that is projected for this area of western Riverside County. Discussion has centered on whether to develop a station site in an area already developed or to anticipate development trends and serve an area that will be developed over the next several years.

- Escondido at the SR-78 and I-15 Interchange - This location allows a multimodal connection with the proposed North County Transit District (NCTD) light-rail extension on the Escondido/Oceanside Line. This option requires a transit connection with the Escondido Transit Center to the east.

- Mira Mesa - A potential station site has been identified near the I-15 and Mira Mesa Boulevard interchange. This area is generally characterized by dense development, but there is an undeveloped area west of the corridor that could be used as a station site.

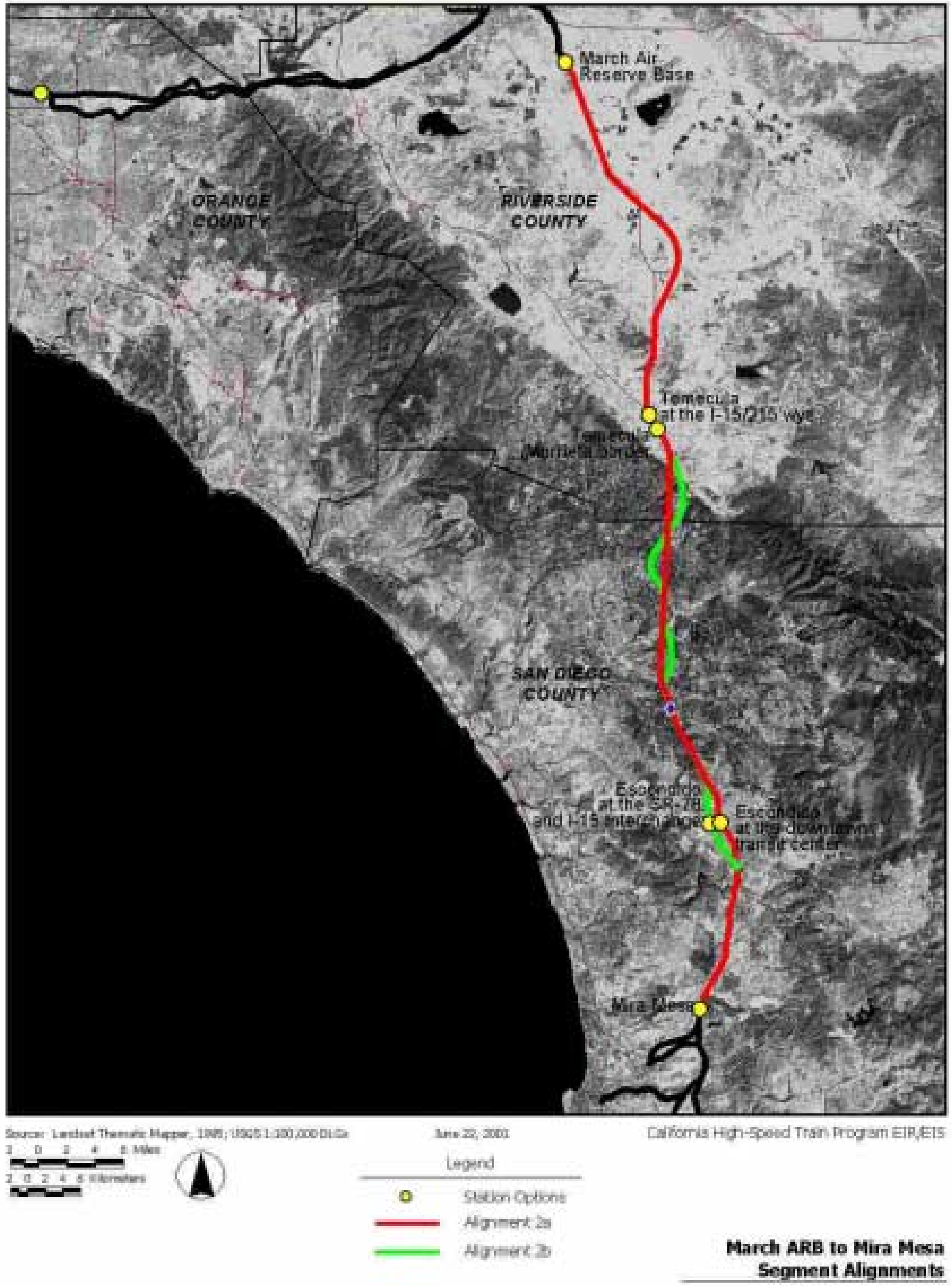
3.1.3 Segment 3: Mira Mesa-to-San Diego (Figure 3.1-3)

- Alignment 3.b - I-15 Freeway-to-Miramar Road-to-San Diego-via-Los Angeles (LOSSAN) Corridor
- Alignment 3.c - I-15 Freeway-to-SR-52-to-San Diego-via-LOSSAN Corridor
- Alignment 3.e - I-15 Freeway-to-Qualcomm Stadium in East Mission Valley

The station locations previously studied that have been included in this phase for further study follow.

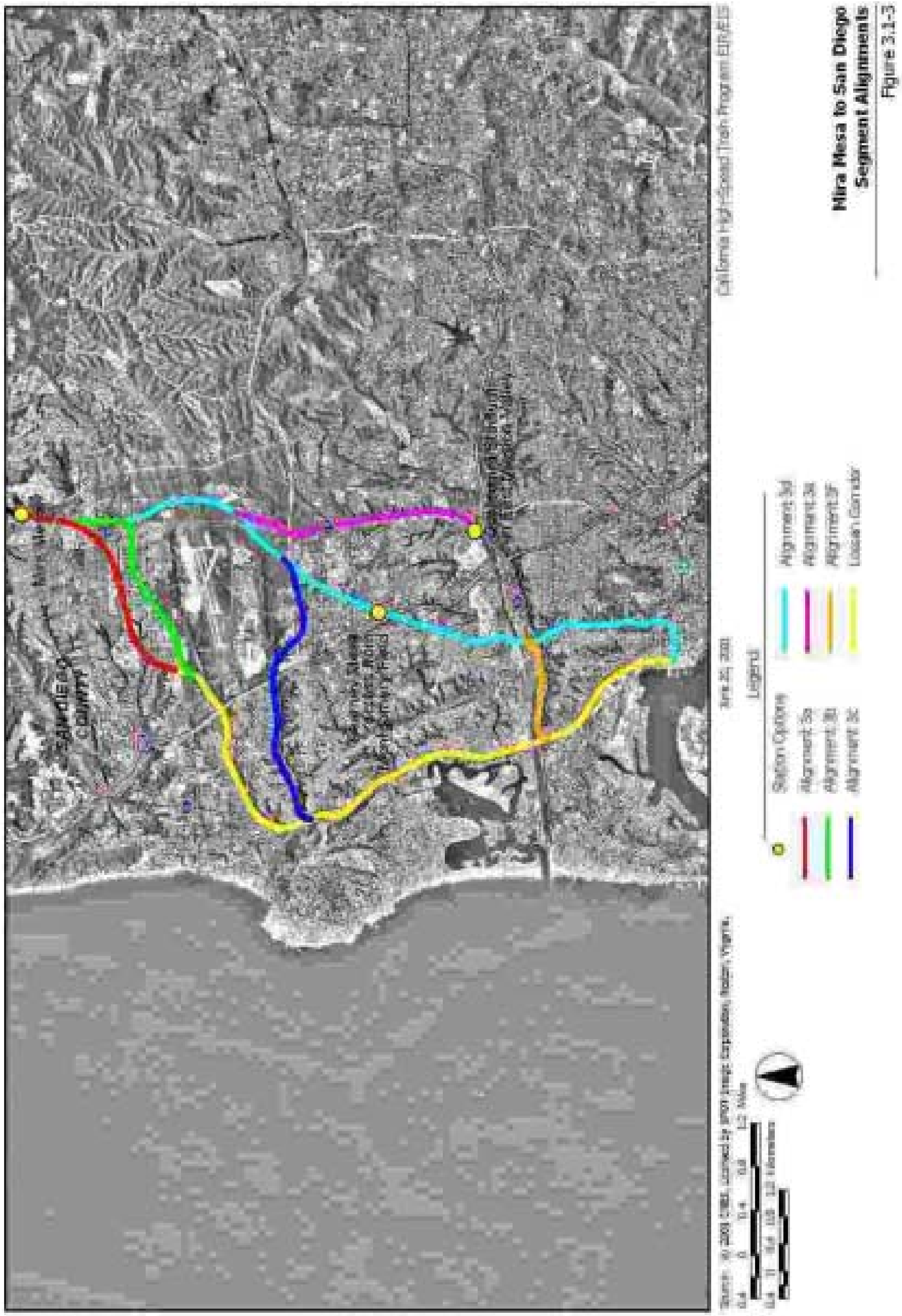
- Qualcomm Stadium – The Qualcomm Stadium site was identified in previous studies as a possible San Diego terminus station, due to the difficulty foreseen in getting a new rail line through the city to the existing downtown station. A multimodal connection with the San Diego Trolley light rail system provides access to downtown from this site. The area is already densely developed with the stadium itself a prominent neighbor.

- Some of the alignments studied in this segment would also connect with stations along the coastal corridor route including University Towne Center, the San Diego Airport, and the Santa Fe terminal in downtown San Diego.



March ARB to Mira Mesa Segment Alignments

Figure 3.1-2


Mira Mesa to San Diego
Segment Alignments
Figure 3.1-3

3.2 CONFIRMATION OF REASONS OPTIONS SCREENED FROM FURTHER ANALYSIS

The Los Angeles-to-San Diego-via-the-Inland Empire corridor is particularly constrained since it is one of the most heavily populated and developed regions in the state encompassing both major metropolitan areas of Los Angeles and San Diego. Therefore, available land to develop new infrastructure is scarce and environmental impacts throughout the corridor are likely. As a result, none of the alignment and station options previously identified have been excluded from further study.

3.3 ADDITIONAL ALIGNMENT AND STATION OPTIONS STUDIED

In order to be as inclusive as possible, additional rail and freeway/arterial corridors are being studied since both types of facilities have transportation functions and dedicated rights-of-way that would minimize the need for purchasing additional land. However, the existing freeway rights-of-way are mostly built out.

Also, as part of the Program EIR/EIS scoping process, several alignment and station options were developed in response to agency and public concerns. For example, the UP Colton/San Bernardino alignment and station grew out of the scoping process to address the request by the City of San Bernardino to evaluate the potential of the project for directly serving the population center of San Bernardino. In addition, the SCAG Maglev studies were used to develop the freeway alignments and the Ontario Airport North station concept for potential Maglev technology.

One additional rail corridor, the UP Riverside Line, meets the general criterion of providing access across the Los Angeles Basin and the San Gabriel Valley to Riverside. In addition, two freeway corridors, I-10 and SR-60, provide dedicated transportation corridors that also may prove useable and, therefore, should be included to develop a comprehensive set of alignments in accordance with environmental regulations governing identification of reasonable project alternatives. The full range of these alignment and station options were deemed to merit further study through the screening evaluation phase of the project.

The geography south of Riverside through Temecula and on to Escondido and Mira Mesa essentially limits the development of alignment options to those that are on or near the existing I-215/I-15 freeway alignments. The high-speed train facility can make use of the existing San Jacinto Line rail corridor but eventually coincides with the freeway alignment for the major portion of the route south towards Escondido. The alignment options in this segment vary only with regard to defining routes through the hilly terrain that either make the most use of tunnel sections to provide a straighter, faster alignment, or that minimize tunnels to reduce the cost.

South of Mira Mesa to San Diego, the alignment options again multiply because there are several existing right-of-way corridors from which to choose depending on whether the objective is to reach San Diego downtown or terminate at Qualcomm Stadium. The additional options to be considered in this segment are an outgrowth of attempts to avoid sensitive environmental lands, significant land uses such as MCAS Miramar and ever-increasing residential development throughout the area. These alignment options are also necessary as part of the process of finding a reasonably straight corridor to maximize speeds, thus minimizing travel times and providing appropriate accessibility to the high-speed train system that would realize the ridership and revenue figures projected.

The additional alignments and stations considered as part of the analysis follow.

3.3.1 Segment 1: Los Angeles Union Station-to-March ARB (Figure 3.1-1)

- Alignment 1.a - LA Union Station to March ARB via UP/Colton Rail Corridor
- Alignment 1.b - LA Union Station to March ARB via UP/Riverside Rail Corridor
- Alignment 1.c - LA Union Station to March ARB via the I-10 Freeway Corridor

- Alignment 1.d - LA Union Station to March ARB via the SR-60 Freeway Corridor
- Alignment 1.f - LA Union Station to March ARB via the UP Colton via San Bernardino

The following additional station locations have been included in this evaluation for further study.

- El Monte West of the I-605 Along the UP Colton Line - This site would provide connections with both Metrolink and local bus service from an adjacent bus transfer station. It also is located in the center of El Monte and offers good access from the surrounding community. An alternative station site could be located on I-10.
- South El Monte West of the I-605 Along SR-60 - This site provides good access to and from the area freeway system. There are, however, a number of substantial grade-crossing issues associated with this site.
- City of Industry Metrolink Station - This site provides good linkages with Metrolink commuter rail service and serves the East San Gabriel Valley as a possible alternative to the historic Pomona Metrolink station. This site is currently relatively isolated from other uses.
- California Polytechnic State University in Pomona - This site provides good access to the university campus and is readily accessible from SR-60; however, it may not be suitably located to capture significant ridership from the surrounding communities.
- Ontario Airport South Metrolink Station - This site is located directly on the UP Riverside Line and has an existing Metrolink station. It is somewhat distant from the airport terminal complex; therefore, a people mover or an additional transit connection may be required for airport access.
- UP Colton Line/San Bernardino - This location is directly on the UP Colton Line with good accessibility from I-10. It also is roughly midway between San Bernardino and Riverside making it a reasonable option for a station to serve both population centers. This location currently does not have good transit or multimodal connections.
- San Bernardino Santa Fe Depot - This location serves the existing Santa Fe Depot that has both Amtrak and adjacent Metrolink service. There are issues with siting a high-speed train station due to the train and BNSF intermodal facilities located there; however, it serves a major population center and it has good transit and multimodal connections. It has limited parking.

3.3.2 Segment 2: March ARB-to-Mira Mesa (Figure 3.1-2)

- Alignment 2.a - I-215/I-15 Freeway Corridor alignment that maximizes tunnels to reduce travel times

The following additional station locations have been included in this evaluation for further study.

- Temecula/Murrieta Border - This site is near the I-15/Winchester Road Interchange bordering Murrieta and Temecula. It has good freeway access, but it is not located near any major business or commercial centers.
- Escondido Transit Center - The existing Escondido Transit Center offers a direct connection to local transit. This site is located on the edge of downtown Escondido.

3.3.3 Segment 3: Mira Mesa-to-San Diego (Figure 3.1-3)

- Alignment 3.a - From I-15 through Carroll Canyon/Miramar Road to San Diego via LOSSAN Corridor
- Alignment 3.d - From I-15 to SR-163 to San Diego
- Alignment 3.f - From I-15 to SR-163 to I-8 to San Diego via LOSSAN Corridor

The following additional station location has been included in this evaluation for further study.

- Kearny Mesa Across from Montgomery Field - This potential station site would be served if the SR-163/I-8 alignment were selected through or under Balboa Park. It has good freeway access and is located near a general aviation airport.

3.4 FINAL LIST OF ALIGNMENT AND STATION OPTIONS STUDIED

The following is a comprehensive list of the alignments and stations within the three segments that are being carried forward through this screening evaluation. These are the focus of the analysis that has been undertaken to evaluate the impact of the proposed project on various environmental, engineering, and planning factors described further in Chapter 4 of this report. Figures 3.4-1 through 3.4-21 identify each of the potential station locations overlaid on an aerial photograph to illustrate the general siting and dimensions of station platforms.

3.4.1 Segment 1: Los Angeles Union Station-to-March ARB

- Alignment 1.a - LA Union Station to March ARB via the UP/Colton Rail Corridor
- Alignment 1.b - LA Union Station to March ARB via the UP/Riverside Metrolink Rail Corridor
- Alignment 1.c - LA Union Station to March ARB via the I-10 Freeway Corridor
- Alignment 1.d - LA Union Station to March ARB via the SR-60 Freeway Corridor (rail only and rail/freeway variation)
- Alignment 1.e - LA Union Station to March ARB via the BNSF/SR-91 Rail/Freeway Corridor
- Alignment 1.f - LA Union Station to March ARB via the UP Colton/BNSF Rail Corridor to San Bernardino
- Alignment 1.g - LA Union Station to March ARB via the UP/Riverside Metrolink and UP/Colton Metrolink Rail Corridors

Station locations included in this evaluation include the following.

- El Monte West of the I-605 Along the UP Colton Line (alternative site on I-10)
- South El Monte West of the I-605 Along SR-60
- Norwalk Metrolink Station
- Fullerton Metrolink Station
- City of Industry Metrolink Station
- California Polytechnic State University in Pomona (Cal Poly Pomona)
- Pomona Metrolink Station
- Ontario Airport North
- Ontario Airport South Metrolink Station
- Riverside, Downtown Metrolink Station
- University of California at Riverside
- UP Colton Line/San Bernardino
- San Bernardino Santa Fe Depot
- March Air Reserve Base

3.4.2 Segment 2: March ARB-to-Mira Mesa

- Alignment 2.a - I-215/I-15 Freeway Corridor
- Alignment 2.b - I-215/I-15 Freeway Corridor alignment that maximizes tunnels to reduce travel times

Station locations included in this evaluation include the following.

- Temecula at the I-15/215 Wye

- Temecula/Murrieta border
- Escondido at the SR-78 and I-15 Interchange
- Escondido at the Downtown Transit Center
- Mira Mesa

3.4.3 Segment 3: Mira Mesa-to-San Diego

- Alignment 3.a - From I-15 through Carroll Canyon/Miramar Road to San Diego via the LOSSAN Corridor
- Alignment 3.b - I-15 Freeway to Miramar Road to San Diego via the LOSSAN Corridor
- Alignment 3.c - I-15 Freeway to SR-52 to San Diego via the LOSSAN Corridor
- Alignment 3.d - From I-15 to SR-163 to San Diego
- Alignment 3.e - I-15 Freeway to Qualcomm Stadium in East Mission Valley
- Alignment 3.f - From I-15 to SR-163 to I-8 to San Diego via the LOSSAN Corridor

Station locations included in this evaluation include the following.

- Kearny Mesa across from Montgomery Field
- Qualcomm Stadium in East Mission Valley

Table 3.4-1 summarizes the alignments and potential station location options under consideration within each segment; and characterizes the associated profile assumptions.

Table 3.4-1
Alignment and Station Options Under Consideration
Los Angeles-to-San Diego-via-the-Inland Empire

Alignment Option	Station Options	Alignment Profile
Segment 1 – Los Angeles Union Station-to-March ARB-Segment Rail Alignments		
1.a - UP/Colton Line From LA Union Station east along the UP/Colton Line turning south Colton (near I-215/I-10 interchange), on the BNSF-San Jacinto Line, then following I-215/ I-15 south. Passing in the vicinity of Boyle Heights, San Gabriel, Ontario, Colton, and Riverside.	• LA Union Station • South El Monte, West of I-605 • Pomona, Metrolink Station • Ontario Airport, Northside • Colton Line near San Bernardino • UC Riverside • March ARB	• Urban aerial or trench configuration. • Partially at-grade along I-10 and Railroad Row.

Table 3.4-1
Alignment and Station Options Under Consideration
Los Angeles-to-San Diego-via-the-Inland Empire

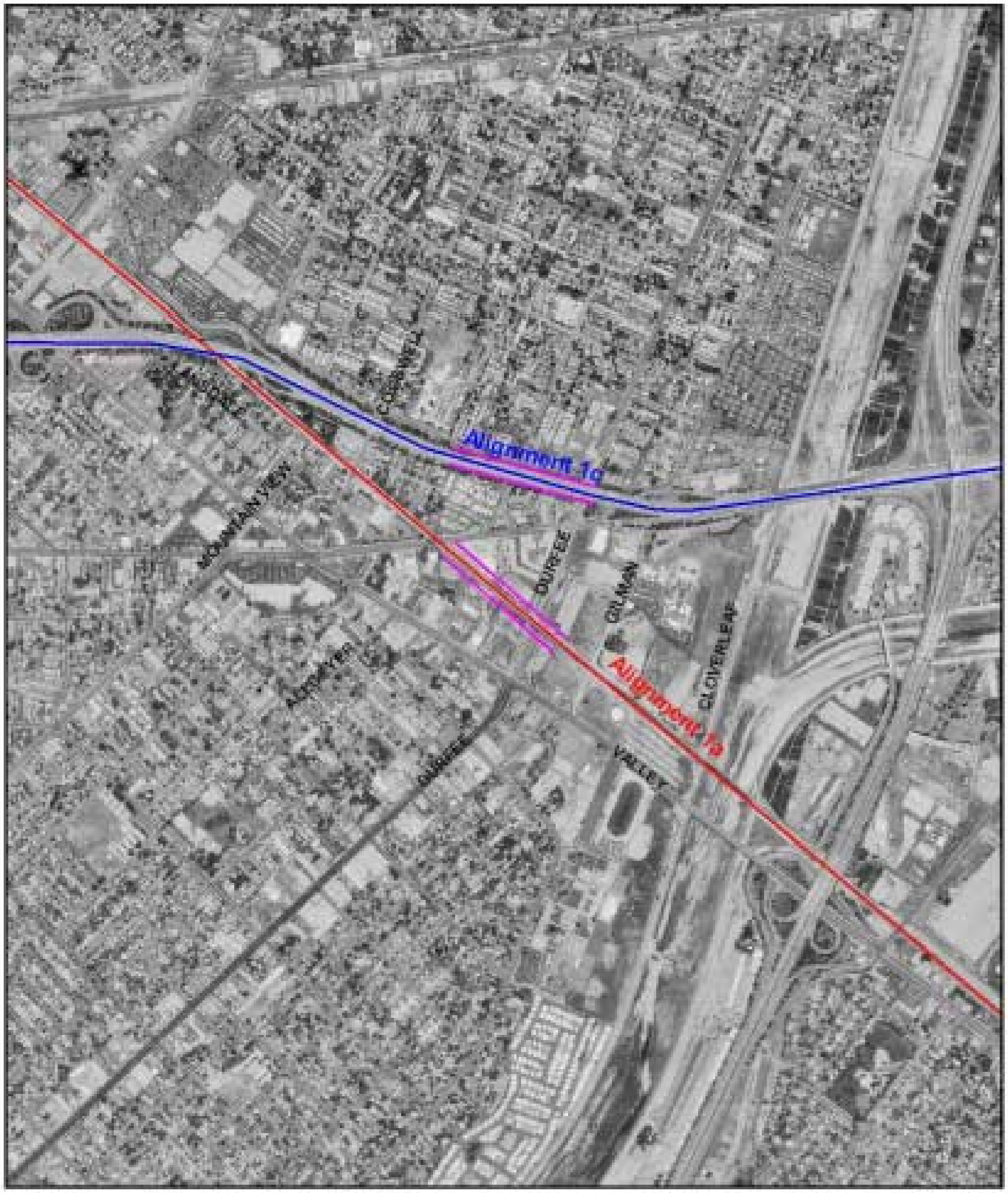
Alignment Option	Station Options	Alignment Profile
1.b - UP/Riverside Line From LA Union Station along the UP/Riverside Line, turning south in Riverside (near I-215/SR-60 interchange), on the BNSF-San Jacinto Line, then following I-215/I-15 south. Passing in the vicinity of East Los Angeles, City of Industry, Pomona, Ontario, and Riverside.	• LA Union Station • City of Industry, Metrolink Station • South El Monte, West of I-605 • Pomona, Metrolink Station • Ontario Airport-Southside at Metrolink Station • Downtown Riverside, Metrolink Station • UC Riverside • March ARB	• Urban aerial or trench configuration throughout.
1.c - I-10 Freeway Alignment From LA Union Station following east along I-10 to I-215 and proceeding south to I-15. Passing in the vicinity of Boyle Heights, Alhambra, Rosemead, El Monte, Baldwin Park, West Covina, Pomona, and Ontario.	• LA Union Station • El Monte West of I-605 • Cal Poly Pomona, northeast side of campus • Ontario Airport, Northside • UC Riverside • March ARB	• Urban aerial throughout.
1.d - SR-60 Freeway Alignment From LA Union Station following east along SR-60 to I-215 and proceeding south to I-15. Passing in the vicinity of East Los Angeles, Monterey Park, Montebello, City of Industry, Diamond Bar, Pomona, and Riverside.	• LA Union Station • South El Monte, West of I-605 • City of Industry • Ontario Airport, Southside • Downtown Riverside, Metrolink Station • UC Riverside • March ARB	• Urban aerial throughout.
1.e - BNSF Fullerton Line/SR-91 From LA Union Station along the BNSF Fullerton Line to Fullerton, then following east along SR-91 to I-215 and proceeding south to I-15. A variation is an alignment that follows just the BNSF rail corridor. Passing in the vicinity of Vernon, Bell, City of Commerce, Montebello, Pico Rivera, Santa Fe Springs, Fullerton, Anaheim, and Riverside.	• LA Union Station • Norwalk, Metrolink Station • Fullerton Transportation Center • Downtown Riverside, Metrolink Station • March ARB	• Urban aerial and through partially at-grade along BNSF east of Anaheim.

Table 3.4-1
Alignment and Station Options Under Consideration
Los Angeles-to-San Diego-via-the-Inland Empire

Alignment Option	Station Options	Alignment Profile
1.f - UP Colton Line to San Bernardino From LA Union Station east along the UP-Colton Railroad Line turning north in the City of Ontario past the airport, then east toward the Santa Fe Depot in San Bernardino. Passing in the vicinity of Boyle Heights, San Gabriel, Ontario, Colton, Riverside, and San Bernardino.	• LA Union Station • El Monte West of I-605 • Pomona, Metrolink Station • Ontario Airport, Northside • San Bernardino Santa Fe Depot • March ARB	• Urban aerial or trench configuration.
1.g - UP-Riverside and UP-Colton Lines (CAHSRA Business Plan Alignment) From LA Union Station east along UP/Riverside Line transferring to the UP-Colton Line near Pomona, then east to the city of Colton, turning south at Colton on the BNSF-San Jacinto Line, then following I-215/I-15 south. Passing in the vicinity of East LA, City of Industry, Pomona, Ontario, Colton, Riverside, and March ARB.	• LA Union Station • City of Industry, Metrolink Station • South El Monte, West of I-605 • Pomona, Metrolink Station • Ontario Airport, Northside • Colton Line near San Bernardino • UC Riverside • March ARB	• Urban aerial or trench, partially at-grade along I-10.
Segment 2 – March ARB-to-Mira Mesa		
2.a - San Jacinto to I-15 Alignment From Riverside running along the San Jacinto Line along I-215 past March ARB through Murrieta and Temecula and south along I-15 to Escondido, tunneling as necessary on either side of the freeway. Passing in the vicinity of Murrieta, Temecula, Rainbow, Pala Mesa Village, Hidden Meadows, and Escondido.	• Murrieta at I-15/I-215 Interchange • Temecula-Murrieta near Winchester Interchange • Escondido Transit Center • Escondido, at the SR-78/ I-15 interchange • Mira Mesa • Kearny Mesa near Montgomery Field • Qualcomm Stadium	• At-grade to Temecula, then tunnels through mountains. Urban aerial in Escondido and in spot locations throughout.
2.b - Freeway Alignment along I-215/I-15 From Riverside through Temecula to Escondido staying within the freeway corridor with minimal tunneling. Passing in the vicinity of Murrieta Hot Springs, Temecula, Rainbow, Pala Mesa Village, Hidden Meadows, and Escondido.	• Murrieta at I-15/I-215 Interchange • Temecula-Murrieta near Winchester Interchange • Escondido transit center • Escondido, at the SR-78/ I-15 interchange • Mira Mesa	• Fewer tunnels through mountains, urban aerial throughout. Limited opportunity to run at-grade.
Segment 3 – Mira Mesa-to-San Diego		

Table 3.4-1
Alignment and Station Options Under Consideration
Los Angeles-to-San Diego-via-the-Inland Empire

Alignment Option	Station Options	Alignment Profile
3.a - I-15 to Coast via Carroll Canyon South along I-15 to Mira Mesa then west through Carroll Canyon to connect to LOSSAN Corridor at University Towne Center. Passing in the vicinity of Mira Mesa, Sorrento Mesa, and Sorrento Valley.	• University Towne Center and LOSSAN Stations addressed by Los Angeles-to-San Diego-via-Orange County analysis.	• Aerial structure and some tunnel throughout.
3.b - I-15 to Coast via Miramar Road South along I-15 to Mira Mesa then west along Miramar Road to connect to LOSSAN Corridor at University City. Passing in the vicinity of Miramar and University Towne Center.	• University Towne Center and LOSSAN Stations addressed by Los Angeles-to-San Diego-via-Orange County analysis.	• Aerial throughout.
3.c - I-15 to Coast via SR-52 South along I-15 to Mira Mesa then west along SR-52 to connect to LOSSAN Corridor at the coastal route. Passing in the vicinity of Kearny Mesa, Clairemont, and University Town Center.	• University Towne Center and LOSSAN Stations addressed by Los Angeles-to-San Diego-via-Orange County analysis	• Aerial throughout.
3.d - I-15 to SR-163 to Downtown San Diego. Passing in the vicinity of Mira Mesa, Miramar, Kearny Mesa, Linda Vista, Mission Valley, Hillcrest, Middletown, and downtown San Diego.	• Kearny Mesa near Montgomery Field • Downtown San Diego via tunnel to Santa Fe depot.	• Aerial structure, tunnel under Balboa Park.
3.e - I-15 to Qualcomm South along I-15 from Escondido to Qualcomm Stadium in East Mission Valley. Passing in the vicinity of Rancho Bernardo, Carmel Mountain Ranch, Rancho Penasquitos, Miramar Ranch North, Mira Mesa, Miramar, Kearny Mesa, Tierrasanta, Mission Village, and Mission Valley.	• Kearny Mesa near Montgomery Field • Qualcomm Stadium.	• Aerial throughout.
3.f - I-15 to SR-163 to I-8 and Joining the LOSSAN Corridor South from I-15 to SR-163 to I-8 and then west on I-8, joining the LOSSAN Corridor. Passing in the vicinity of Mira Mesa, Miramar, Kearny Mesa, Linda Vista, Mission Valley, and downtown San Diego	• Kearny Mesa near Montgomery Field • Downtown San Diego via Santa Fe.	• Aerial throughout.



Source: Digital Orthophotography; 4/10/2001

300 0 300 600 900 1200 Feet

100 0 100 Meters

June 22, 2001

California High-Speed Train Program EIR/EIS

Legend

Station Platforms

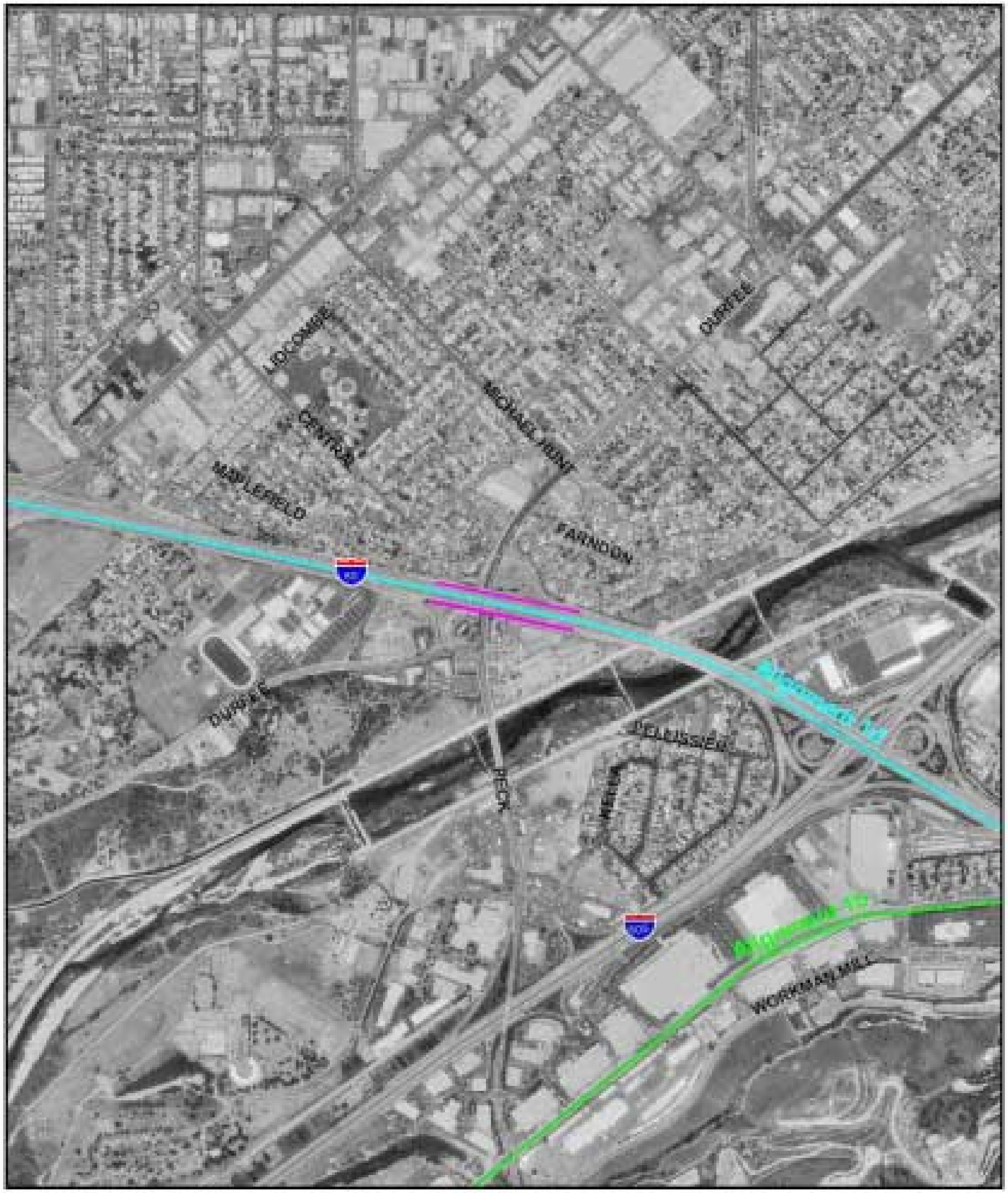
Alignment 1a

Alignment 1c

El Monte west of the I-605 along the UP Colton Line

Los Angeles to March ARB Segment

Figure 3.4-1



Source: Digital Orthophotography: 4/18/2001

300 0 300 600 900 1200 Feet

100 0 100 Meters

June 22, 2001

California High-Speed Train Program EIR/EIS

Legend

Station Platforms

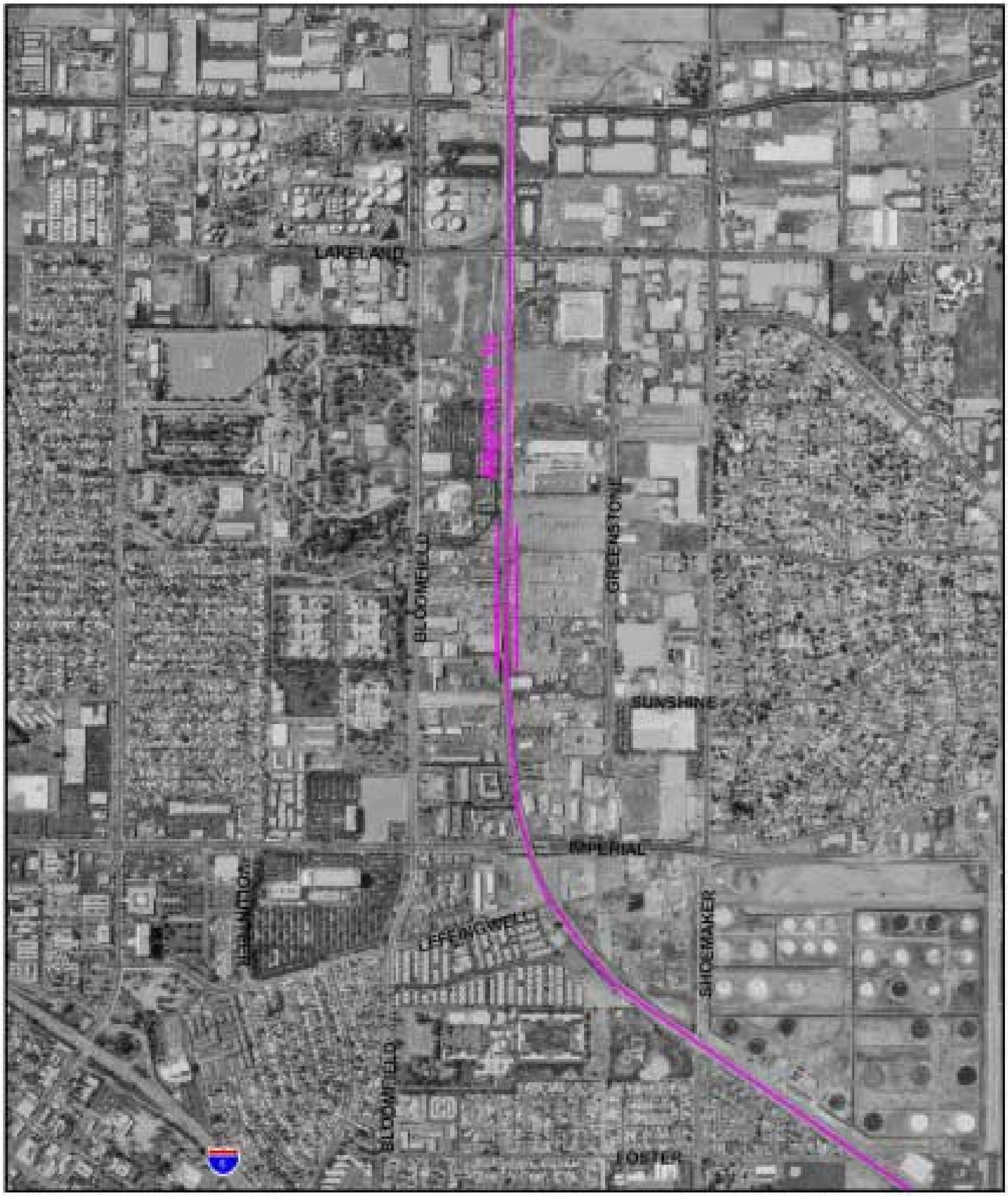
Alignment 1b

Alignment 1d

South El Monte
west of the I-605 along SR-60

Los Angeles to March ARB Segment

Figure 3.4-2



Source: Digital Orthophotography; 4/16/2001

300 0 300 600 900 1200 Feet

100 0 100 Meters

June 22, 2001

California High-Speed Train Program EIR/EIS

Legend

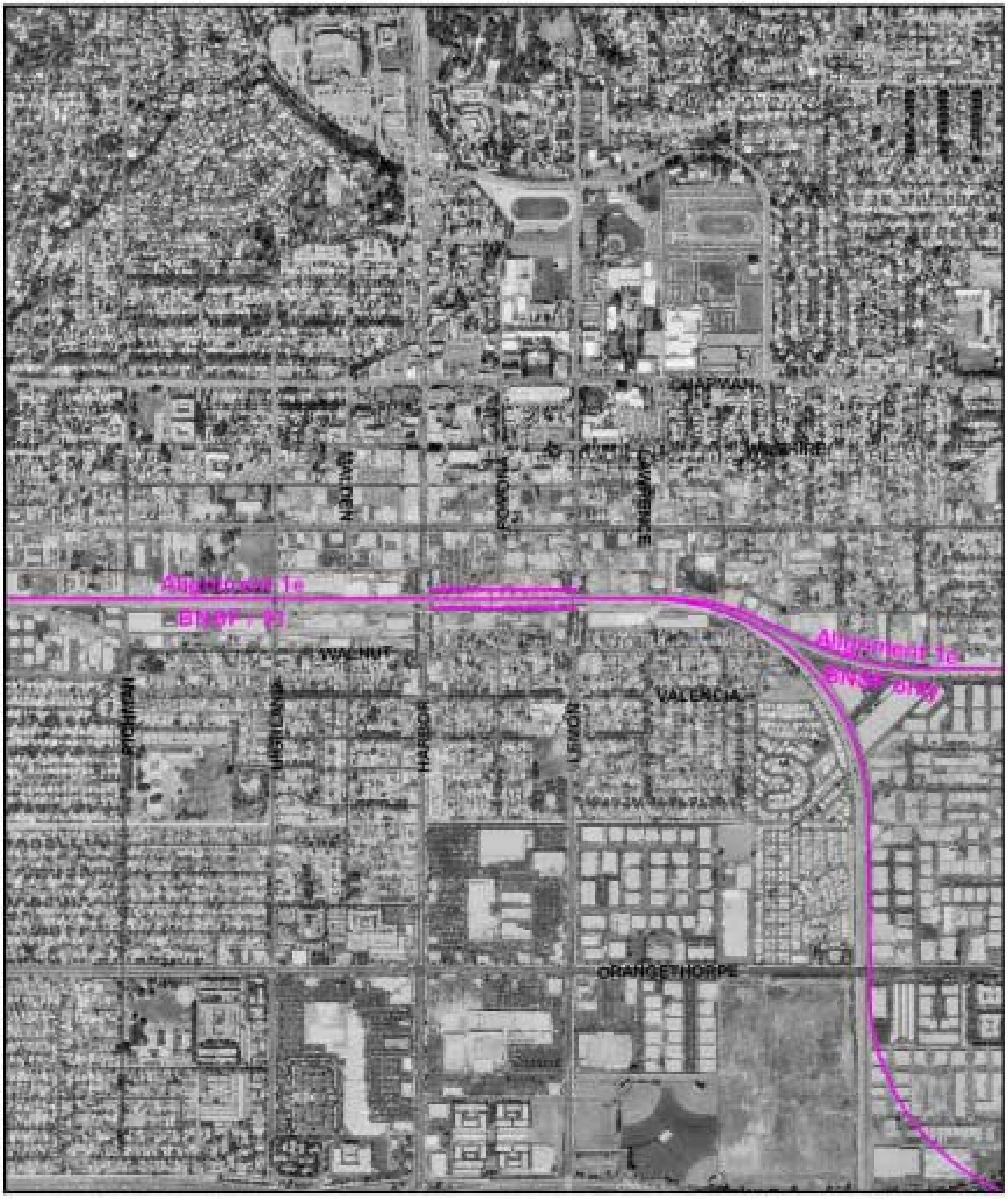
Station Platforms

Alignment 1e

Norwalk Metrolink Station

Los Angeles to March ARB Segment

Figure 3.4-3



Source: Digital Orthophotography; 4/18/2001
300 0 300 600 900 1200 Feet
100 0 100 Meters

June 22, 2001

California High-Speed Train Program EIR/EIS

Legend

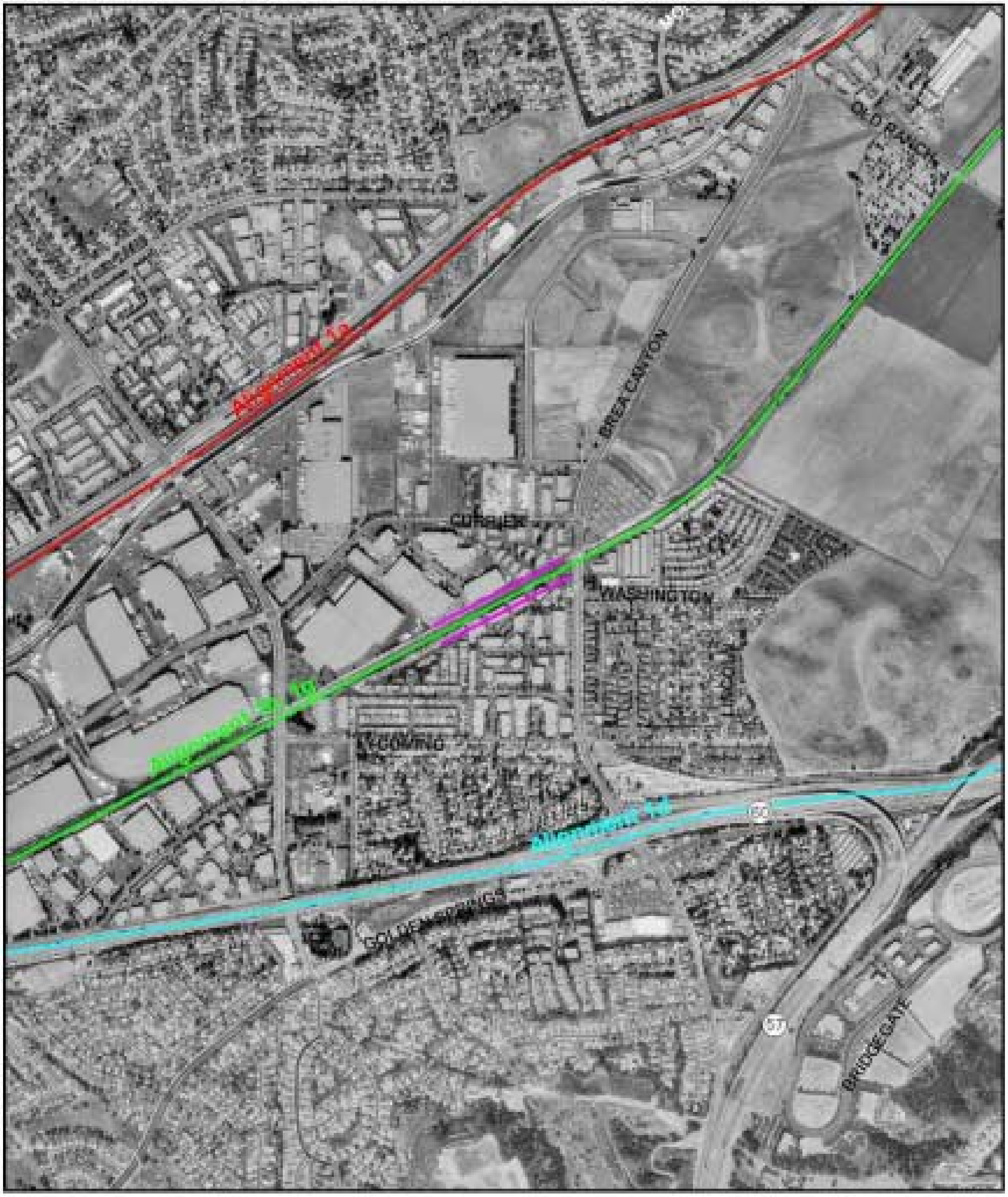
Station Platforms

Alignment 1e

Fullerton Metrolink Station

Los Angeles to March ARB Segment

Figure 3.4-4



Source: Digital Orthophotography; 4/18/2001

300 0 300 600 900 1200 Feet

100 0 100 Meters

June 22, 2001

California High-Speed Train Program EIR/EIS

Legend

Station Platforms
Alignment 1a
Alignment 1b, 1g
Alignment 1d

City of Industry Metrolink Station

Los Angeles to March ARB Segment

Figure 3.4-5

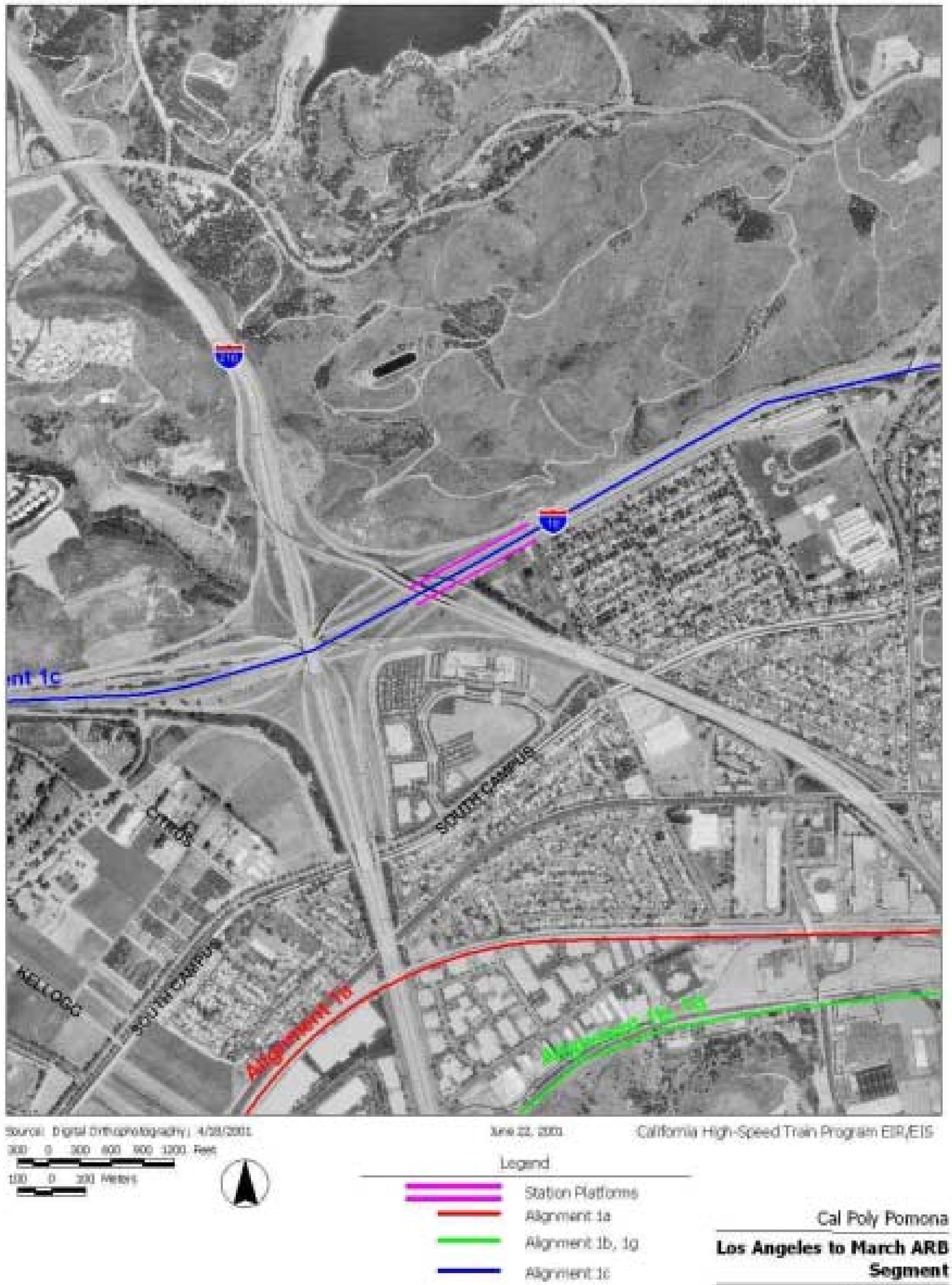
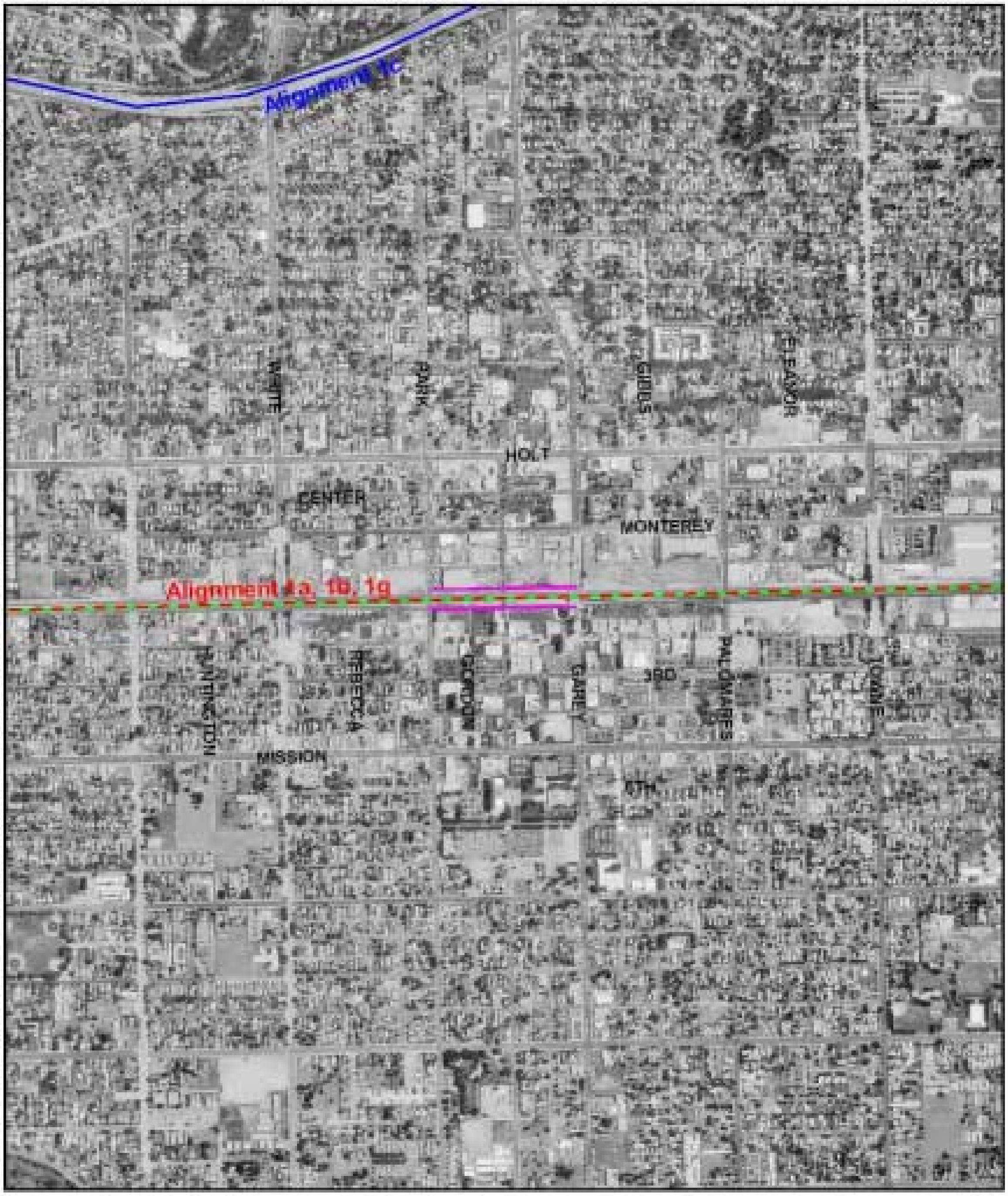

Alignment 1c
SOUTH CAMPUS
CITRUS
KELLOGG
SOUTH CAMPUS
Alignment 1a
Alignment 1b, 1g
Source: Digital Orthophotography; 4/28/2001
300 0 300 600 900 1200 Feet
100 0 100 Meters
June 22, 2001
California High-Speed Train Program EIR/EIS
Legend
Station Platforms
Alignment 1a
Alignment 1b, 1g
Alignment 1c
Cal Poly Pomona
Los Angeles to March ARB Segment

Figure 3.4-6



Source: Digital Orthophotography; 4/18/2001

June 22, 2001

California High-Speed Train Program EIR/EIS

300 0 300 600 900 1200 Feet

90 0 90 Meters

Legend

Station Platforms

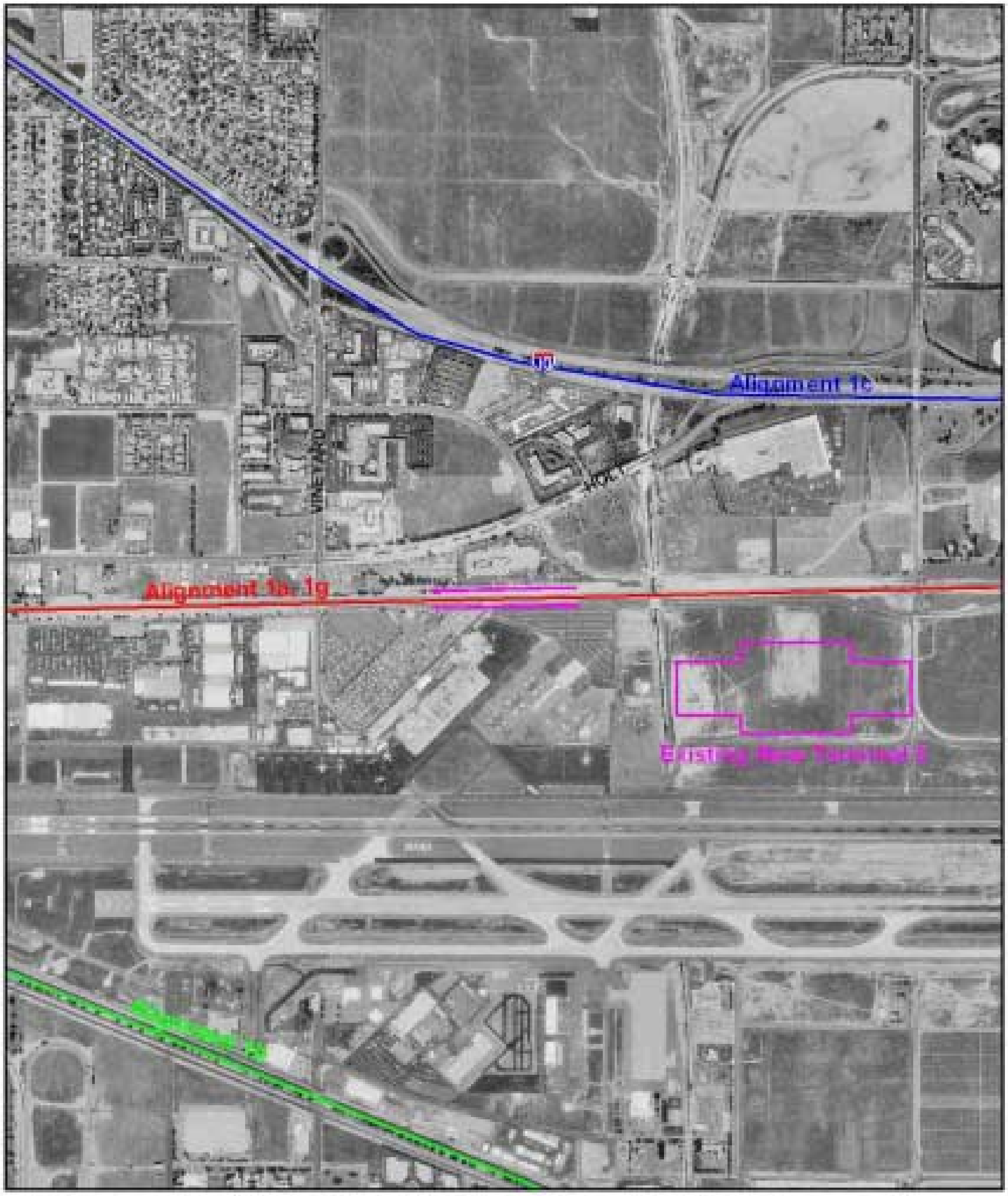
Alignment 1a, 1b, 1g

Alignment 1c

Pomona Metrolink Station

Los Angeles to March ARB Segment

Figure 3.4-7



Source: Digital Orthophotography; 4/18/2001

300 0 300 600 900 1200 Feet

100 0 100 Meters

June 22, 2001

California High-Speed Train Program EIR/EIS

Legend

Station Platforms
Alignment 1a, 1g
Alignment 1b
Alignment 1c

Ontario Airport North

Los Angeles to March ARB Segment

Figure 3.4-8

Source: Digital Orthophotography; 4/18/2001

300 0 300 600 900 1200 Feet

90 0 90 Meters

June 22, 2001

California High-Speed Train Program EIR/EIS

Legend

Station Platforms
Alignment 1b
Alignment 1d

Ontario Airport South Metrolink Station

Los Angeles to March ARB Segment

Figure 3.4-9

Source: Digital Orthophotography: 4/18/2001
300 0 300 600 900 1200 Feet
90 0 90 Meters

June 22, 2001

California High-Speed Train Program EIR/EIS

Legend

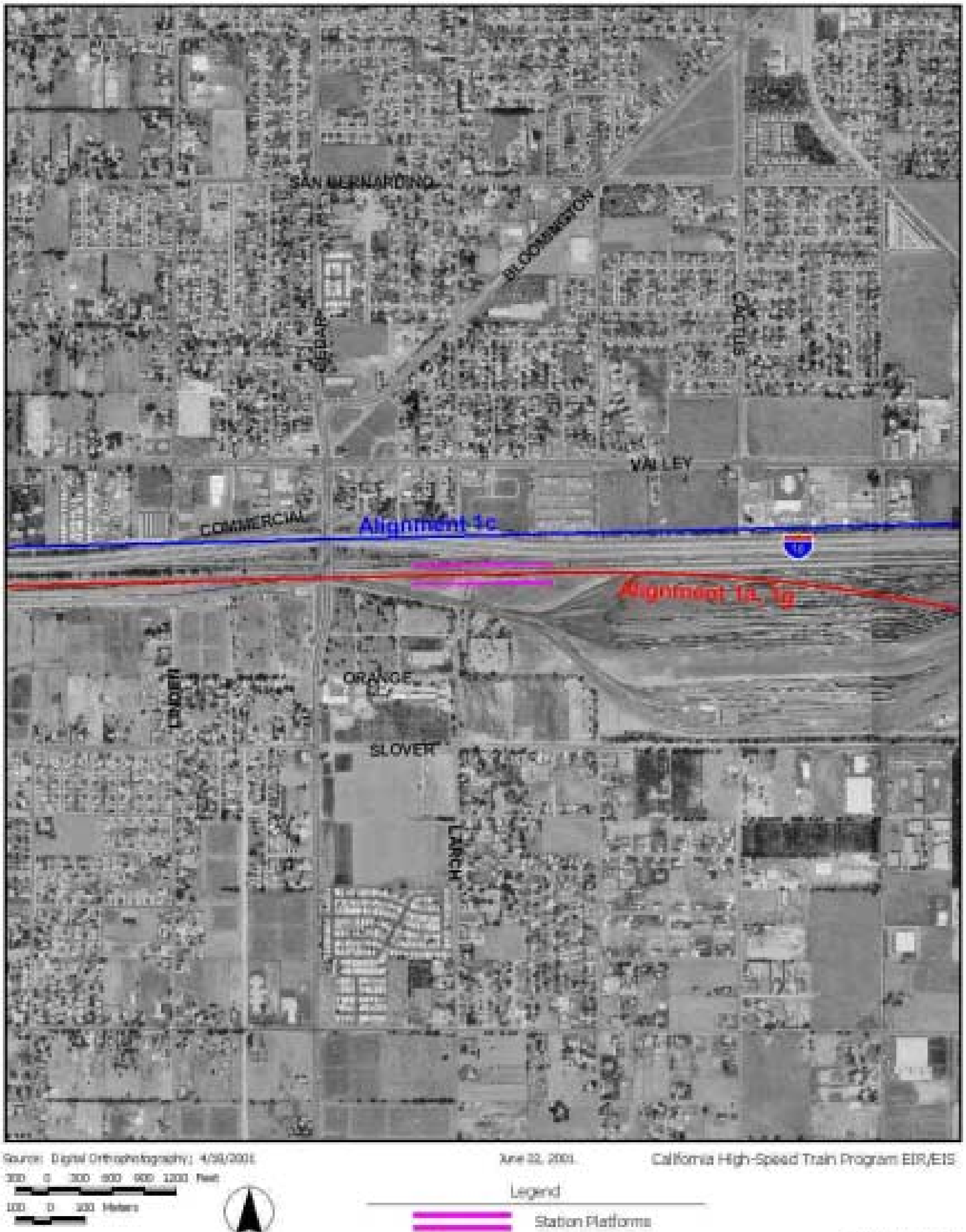
Station Platforms
Alignment 1b
Alignment 1e

Riverside
Downtown Metrolink Station

Los Angeles to March ARB Segment

Figure 3.4-10

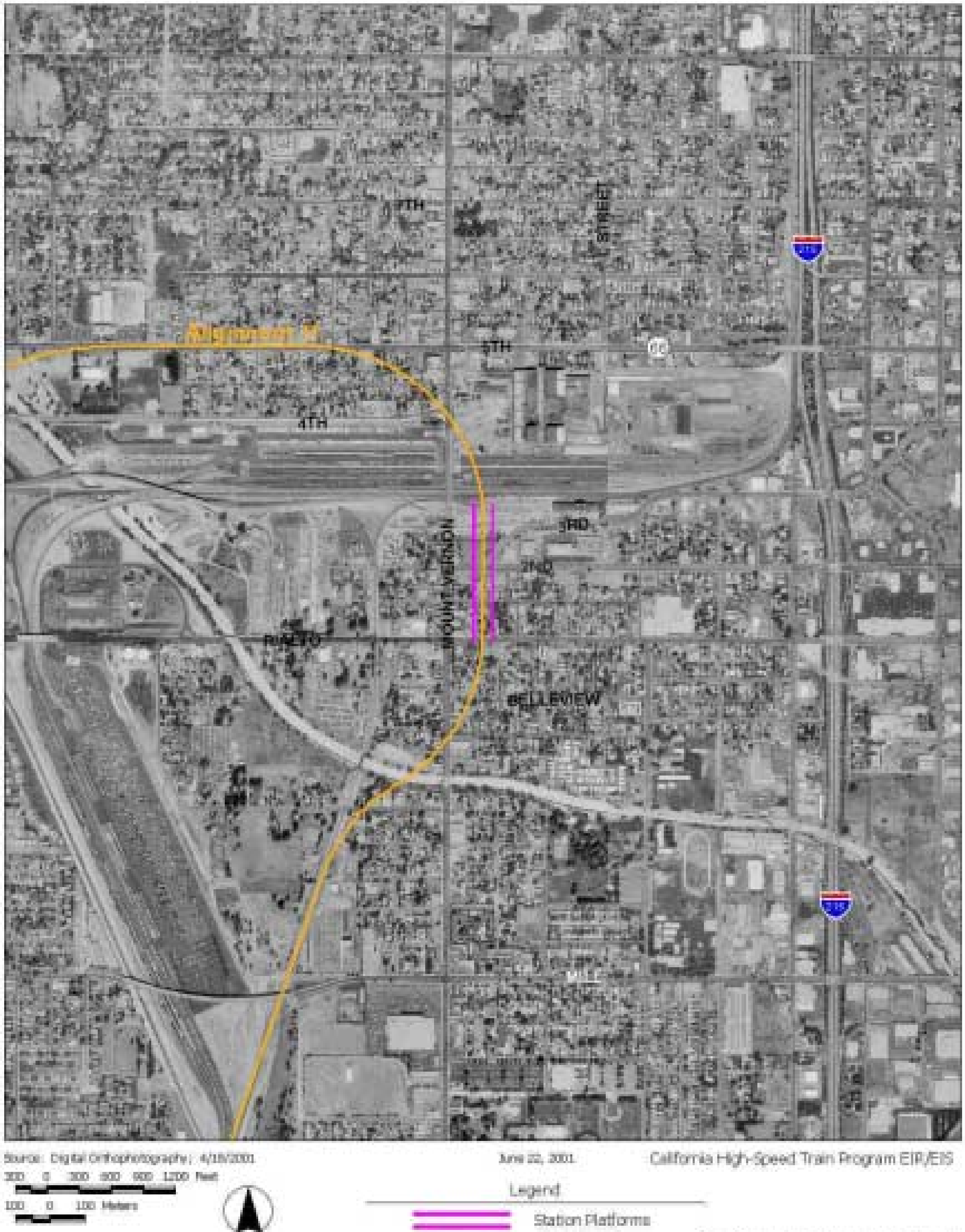

BLAINE
LINDEN
BIG SPRINGS
WATKINS
Alignment 1a
Alignment 1d
Source: Digital Orthophotography; 4/18/2001
300 0 300 600 900 1200 Feet
90 0 90 Meters
June 22, 2001
California High-Speed Train Program EIR/EIS
Legend
Station Platforms
Alignment 1a
Alignment 1d
University of California at Riverside
Los Angeles to March ARB Segment
Figure 3.4-11



Colton Station

Los Angeles to March ARB Segment

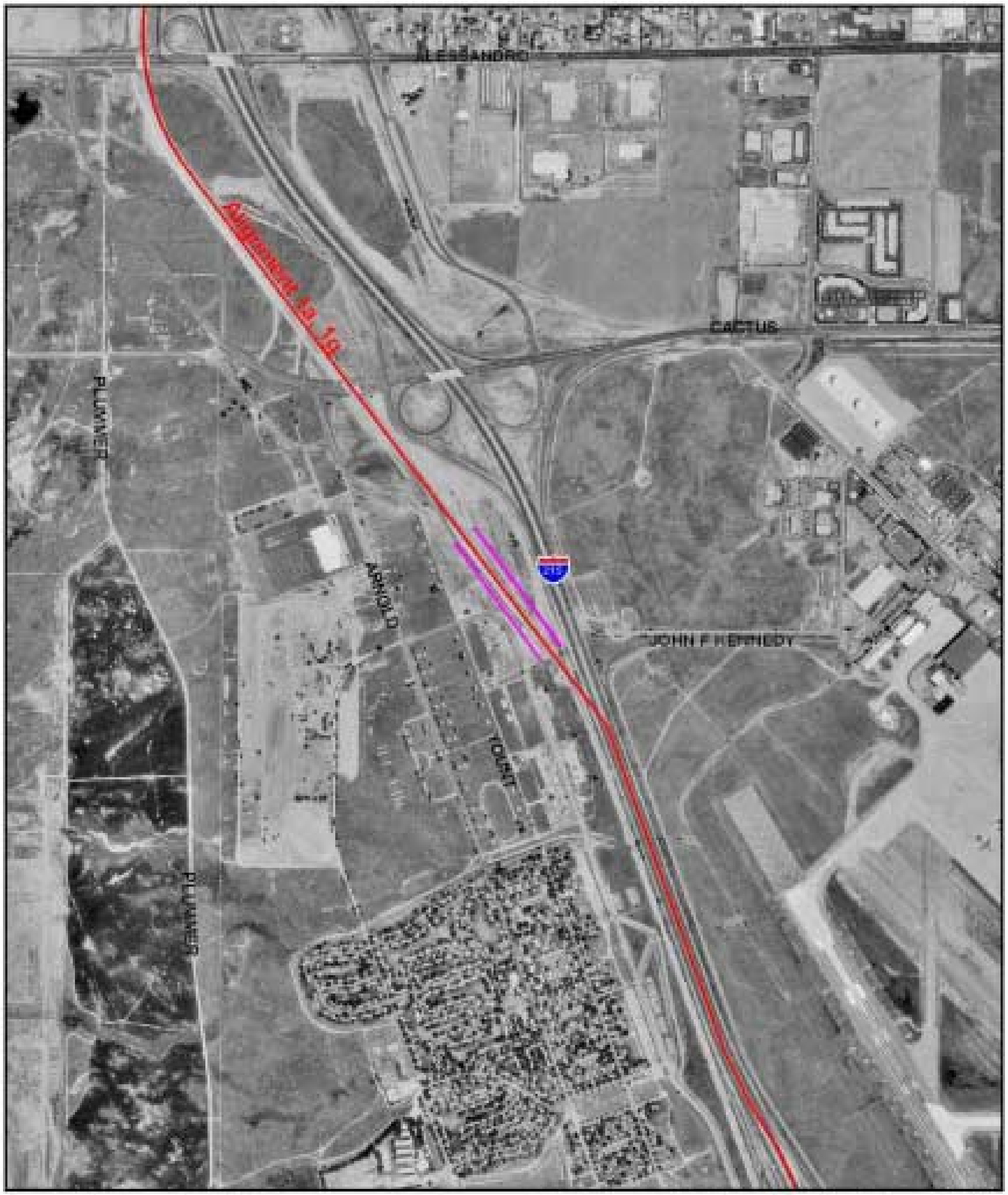
Figure 3.4-12



San Bernardino Santa Fe Depot

Los Angeles to March ARB Segment

Figure 3.4-13



Source: Digital Orthophotography; 4/18/2001

300 0 300 600 900 1200 Feet

100 0 100 Meters

June 22, 2001

California High-Speed Train Program EIR/EIS

Legend

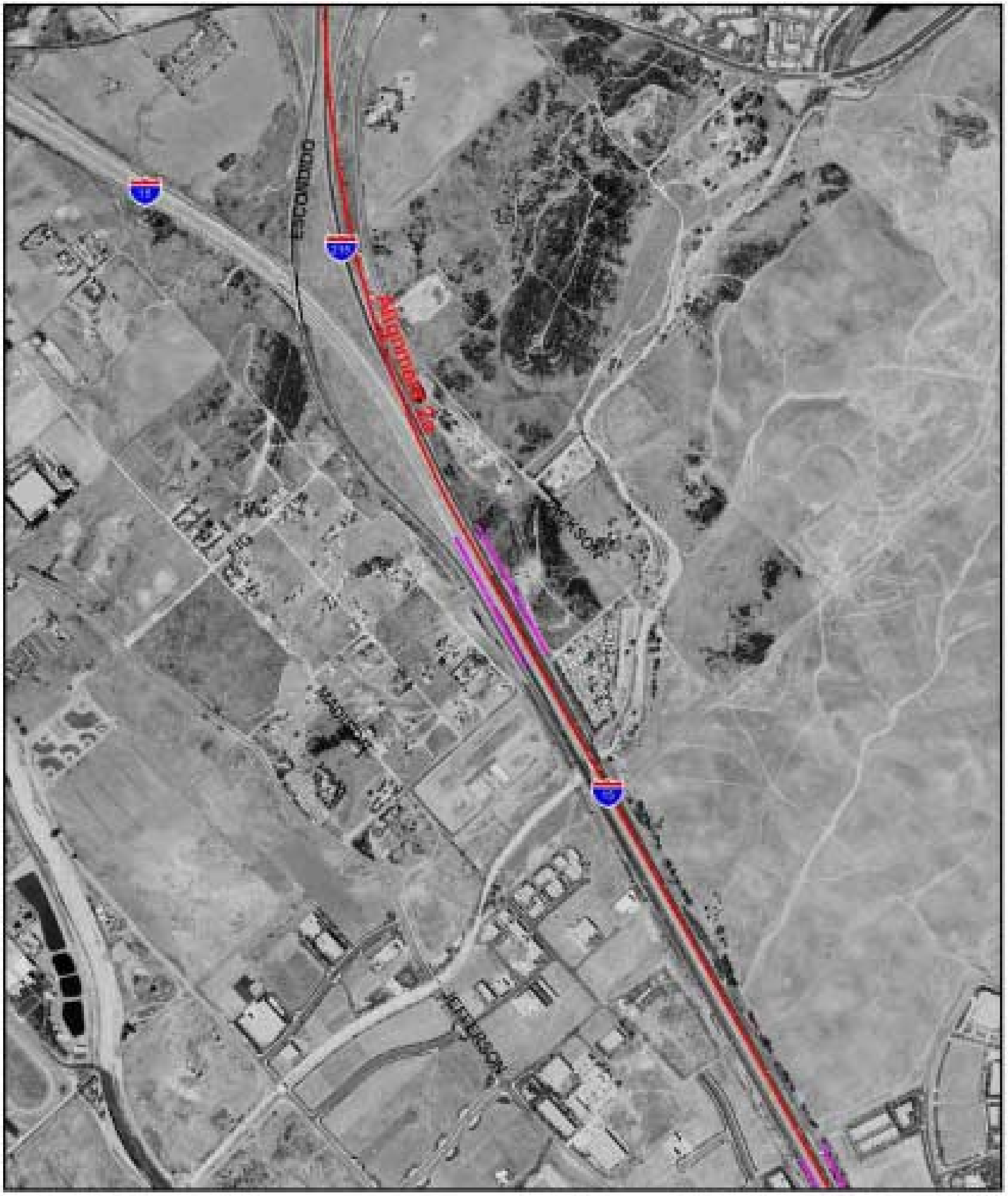
Station Platforms

Alignment 1a, 1g

March Air Reserve Base

Los Angeles to March ARB Segment

Figure 3.4-14



Source: Digital Orthophotography: 4/18/2001

300 0 300 600 900 1200 Feet

100 0 100 Meters

June 22, 2001

California High-Speed Train Program EIR/EIS

Legend

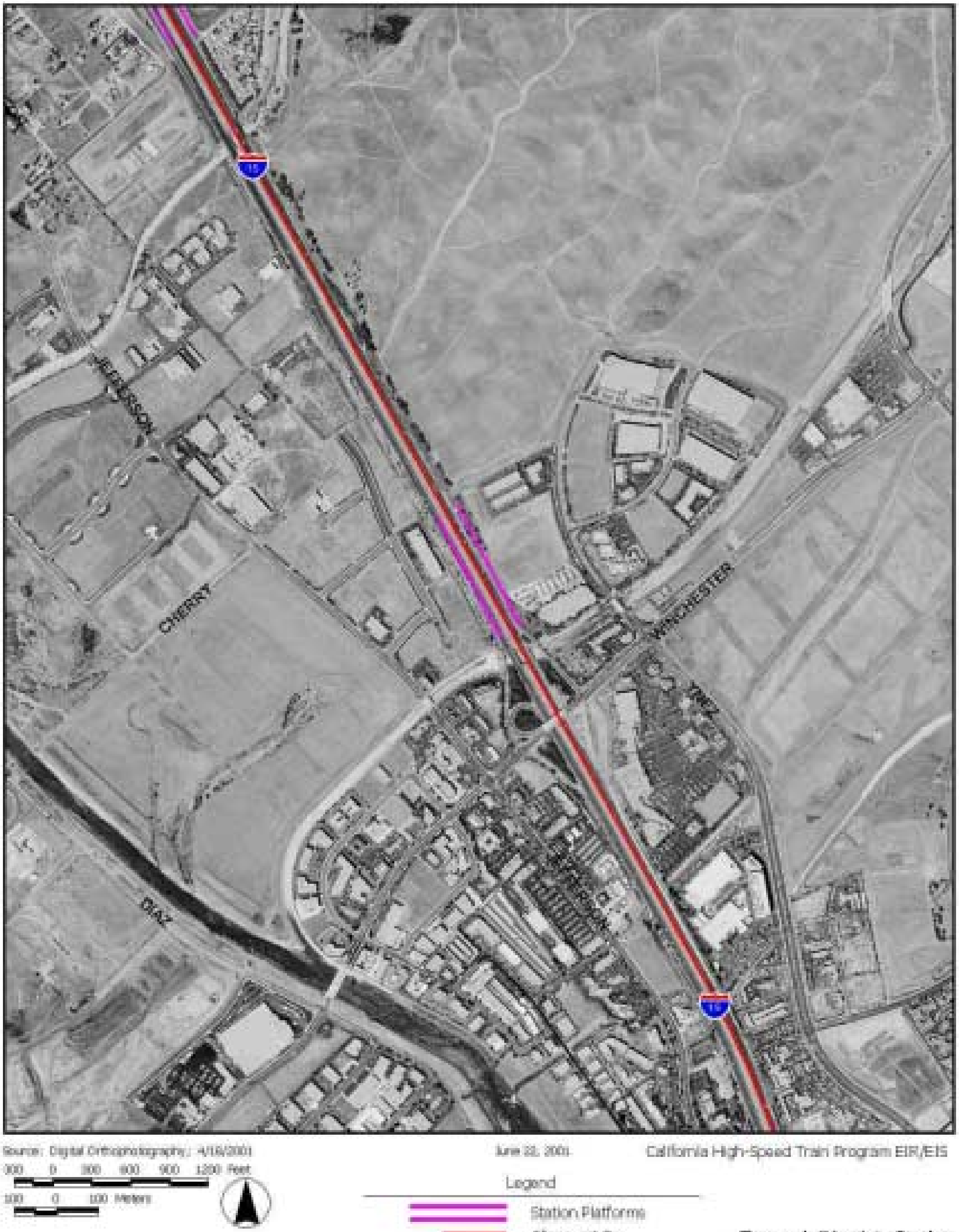
Station Platforms

Alignment 2a

Temecula at the I-15/215 Wye

March ARB to Mira Mesa Segment

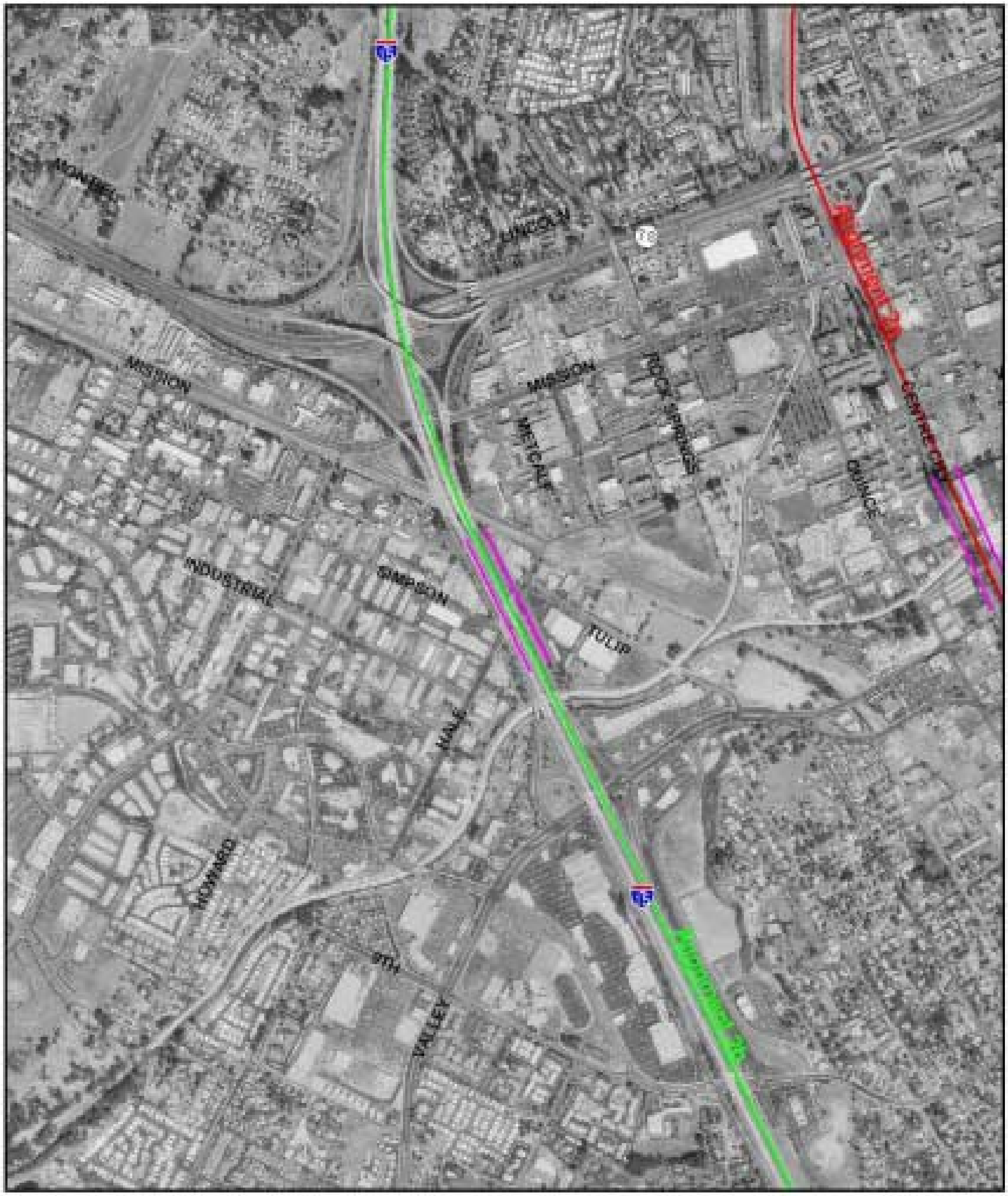
Figure 3.4-15



Temecula/Murrieta Border

March ARB to Mira Mesa Segment

Figure 3.4-16



Source: Digital Orthophotography; 4/10/2001

June 22, 2001

California High-Speed Train Program EIR/EIS

300 0 300 600 900 1200 Feet

100 0 100 Meters

Legend

Station Platforms

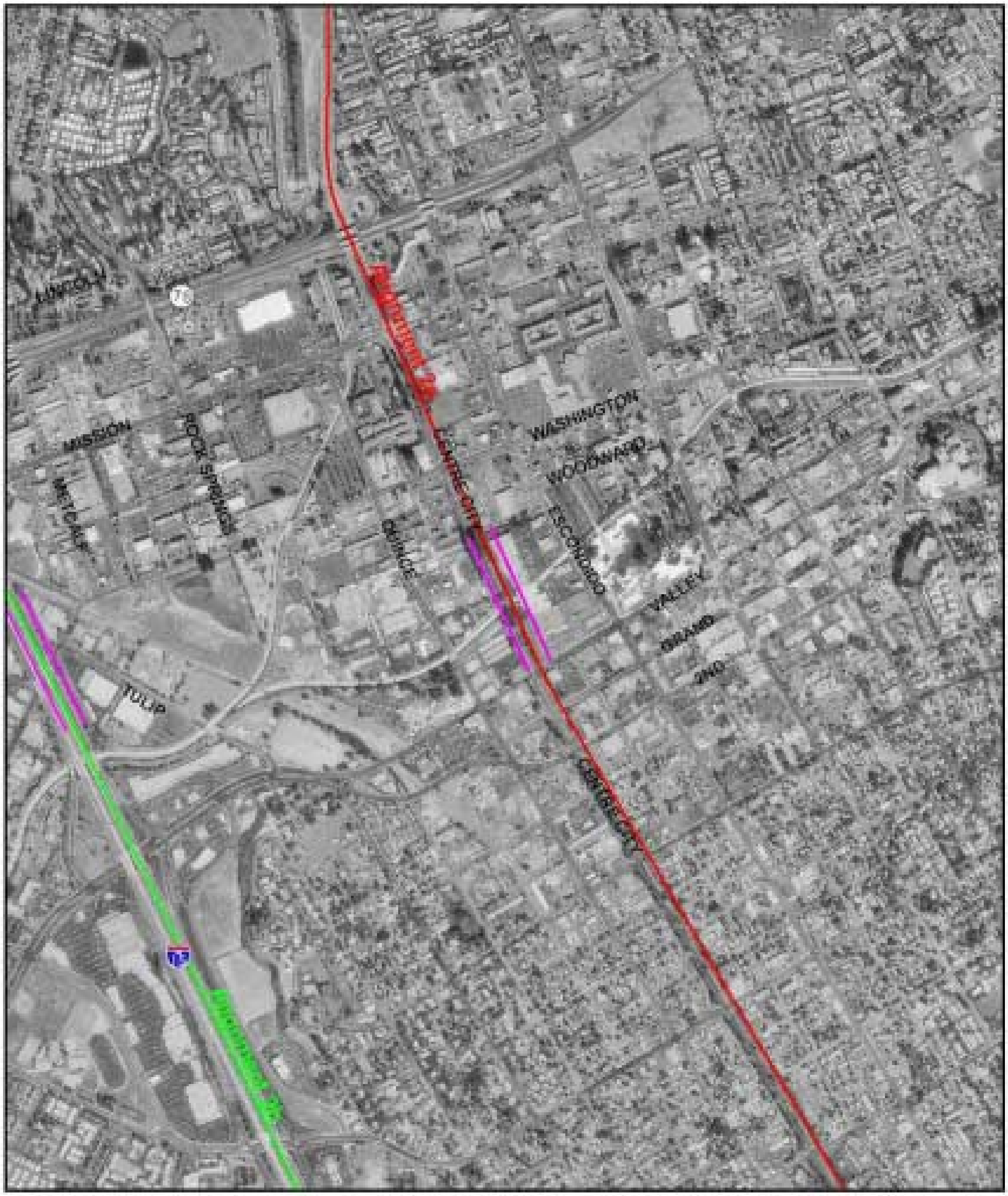
Alignment 2a

Alignment 2b

Escondido at the SR-78 and I-15 Interchange

March ARB to Mira Mesa Segment

Figure 3.4-17



Source: Digital Orthophotography: 4/18/2001

300 0 300 600 900 1200 Feet

100 0 100 Meters

June 22, 2001

California High-Speed Train Program EIR/EIS

Legend

Station Platforms

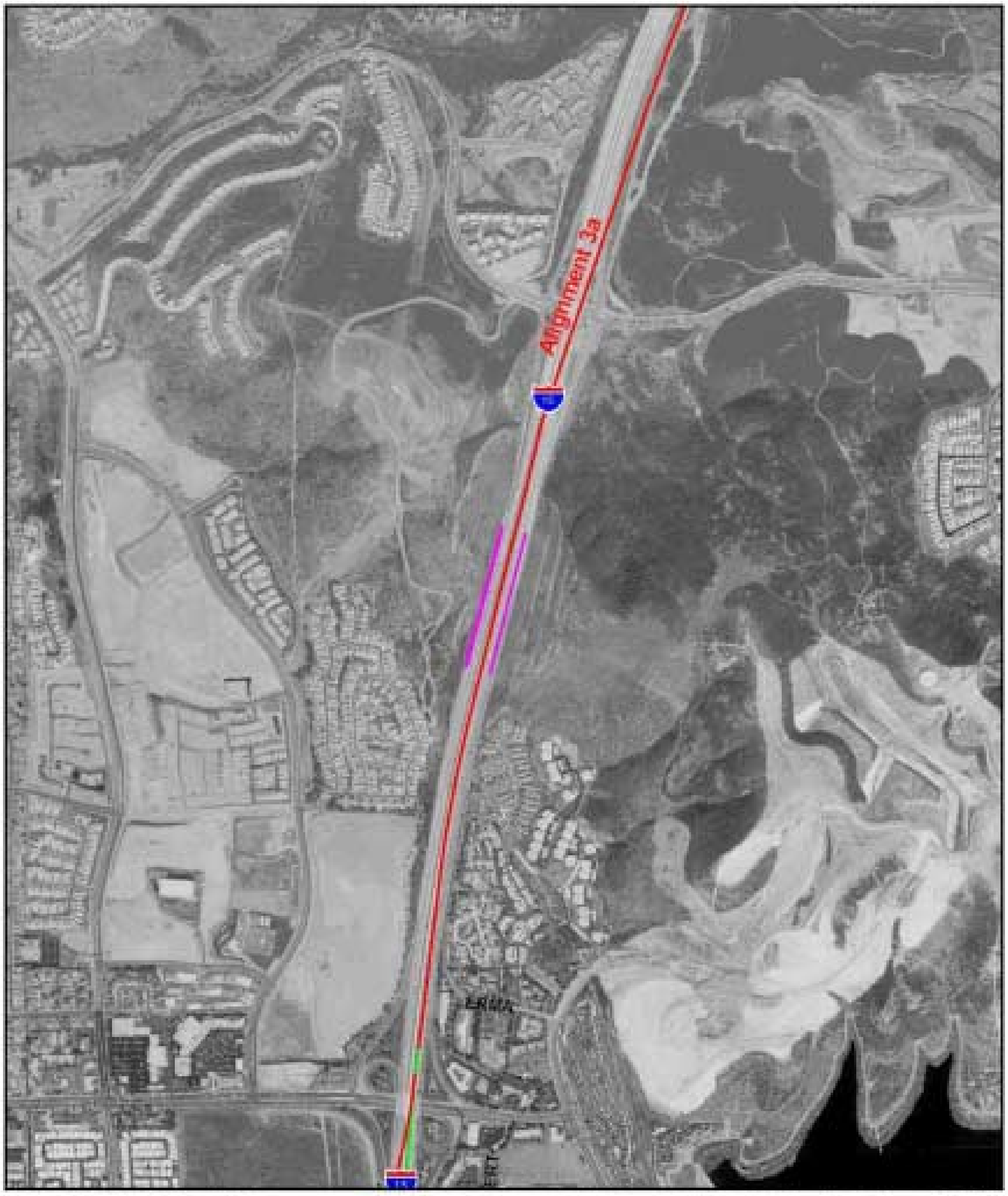
Alignment 2a

Alignment 2b

Escondido
at the downtown transit center

March ARB to Mira Mesa Segment

Figure 3.4-18



Source: Digital Orthophotography, 4/18/2001

300 0 300 600 900 1200 Feet

100 0 100 Meters

June 22, 2001

California High-Speed Train Program EIR/EIS

Legend

Station Platforms

Alignment 3a

Alignment 3b

Mira Mesa

March ARB to Mira Mesa Segment

Figure 3.4-19

Source: Digital Orthophotography; 4/18/2001
300 0 300 600 900 1200 Feet
100 0 100 Meters

June 22, 2001

California High-Speed Train Program EIR/EIS

Legend
Station Platforms
Alignment 3d

Kearney Mesa across from Montgomery Field

Mira Mesa to San Diego Segment

Figure 3.4-20

Source: Digital Orthophotography ; 4/18/2001

300 0 300 600 900 1200 Feet

100 0 100 Meters

June 22, 2001

California High-Speed Train Program EIR/EIS

Legend

Station Platforms

Alignment 3e

Qualcomm Stadium
in East Mission Valley

Mira Mesa to San Diego Segment

Figure 3.4-21

4.0 ALIGNMENT AND STATION EVALUATION

This chapter describes and documents the analysis of new alignment and station options according to the methodologies defined in the Screening Methodology Report (Task 1.5.2). Unique aspects of the application of the methods of analysis are described in the specific regional context. Key information for the various alignment and station options for each evaluation criterion is presented in Tables 4.1-1 through 4.1-4.

4.1 ALTERNATIVE ALIGNMENT AND STATION OPTION COMPARISON

The Los Angeles-to-San Diego-via-the-Inland Empire corridor is divided into three segments for analysis purposes. These segments are organized according to the changes in geography, topography, and urban form that occur along the routes and that may require different construction and system development assumptions. These three segments are Los Angeles to March ARB (Segment 1), March ARB to Mira Mesa (Segment 2), and Mira Mesa to San Diego (Segment 3). Figure 3.0-1, previously presented, identifies the segment, alignments and stations for this region.

4.1.1 Segment 1: Los Angeles to March ARB

A. MAXIMIZE RIDERSHIP/REVENUE POTENTIAL

Travel Time

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: Travel times are a key parameter for consideration in the screening evaluation. In this heavily urbanized segment, travel times among the various alignments do not vary significantly since the maximum system speeds are constrained by alignment geometry throughout the area. The existing railroad right-of-way alignments (Alignments 1.a, 1.b, 1.f, and 1.g) perform somewhat better than the two freeway options (Alignments 1.c and 1.d). The railroad alignment options exhibit travel times of 28.5 minutes for the UP/Colton Line (1.a), 31.0 minutes for *Business Plan* Alignment (1.g), 46.0 minutes for the UP/Riverside Line (1.b), and 36.4 minutes for the UP/Colton to San Bernardino (1.f), compared to travel times of 43.4 minutes (1.c) and 37.4 minutes (1.d) for the freeway options. Alignment 1.e, the combined rail/freeway option alternative along the BNSF/SR-91 Freeway has the longest travel time of 52.2 minutes.

Length

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: The length of the alignment options in this segment are also similar with differences found between the straighter and more direct railroad alignments, and the freeway alignments that have more curves and diversions throughout the segment. The one option that stands out with a longest distance to cover is the UP/Colton to San Bernardino Line (1.f) that traverses 73.6 miles (118.4 km) to connect with the Santa Fe depot in San Bernardino. In descending order, the other option route lengths are the BNSF/SR-91 Line (1.e) at 70.2 miles (112.9 km), the UP/Riverside Line (1.b) at 67.9 miles (109.2 km), the *Business Plan* Alignment (1.g) at 67.5 miles (108.5 km), the UP/Colton Line (1.a) at 66.8 miles (107.7 km), the I-10 Freeway Alignment (1.c) at 63.8 miles (102.6 km), and the SR-60 Freeway Alignment (1.d) at 62.9 miles (101.2 km).

Population/Employment Catchment

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: The 1990 Census was used for all population and employment figures. All of the stations in this segment fall within one of the most populated areas in the state. Almost all the stations are accessible to a significant population from which potential riders for the high-speed train could be drawn. The population living within 10 miles (16.1 km) of a proposed high-speed train station ranges between 400 thousand and 2.3 million people. The population living within 20 miles (32.2 km) of a proposed high-speed train station ranges between 1.1 million and 8.4 million people. The highest population densities are found near the South El Monte Station along SR-60 and at the Norwalk Metrolink Station. The lowest population densities are found near the UC Riverside and March ARB stations.

B. MAXIMIZE CONNECTIVITY AND ACCESSIBILITY

Intermodal Connections

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: The freeway alignments (1.c, 1.d, 1.e) have the poorest alignment characteristics, the most sensitive land uses and the greatest need for agency and external negotiations. The rail alignments (1.a, 1.b, 1.f, 1.g) generally fares better with the major difference being that these routes mostly commercial or industrial uses that are usually more compatible with rail.

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: Connections to other modes of transportation vary among the station options. The greatest number of connections exist wherever a potential high-speed train station is located at or near an existing transit facility. The Pomona Metrolink, City of Industry Metrolink, the Norwalk Metrolink, the Fullerton Transit Center, the San Bernardino Santa Fe Depot and the downtown Riverside stations have the widest range of multimodal connections to local and regional bus services, long distance intercity services provided by Amtrak, and commuter train systems.

Stations were ranked based upon whether their existing and planned land uses were homogenous (preferably vacant/open space, followed by commercial/industrial, and then residential). Sensitive land uses were tracked within 0.25-mile (0.4 km) and intermodal connectivity was measured by the presence of an airport, transit, or Metrolink within 0.5-mile (0.8 km), and degree of interagency coordination needed.

Tier 1: The most preferred stations were at: (1) Cal Poly Pomona, (2) Ontario Airport North, (3) March ARB, and (4) Temecula/Murrieta border. These sites were preferred due to the large amount of open space (and subsequent lack of need for clearance or eminent domain), the single-ownership and less need for interagency coordination, and no glaring environmental justice issues (except Ontario Airport North).

Tier 2: Second tier sites were as follows: (1) UC Riverside, (2) Temecula at the I-15/I-215 Wye, and (3) the UP Colton Line/San Bernardino site. Like Tier 1 sites, Tier 2 sites also had large proportions of vacant acreage, commercial/ industrial, or institutional uses perceived to be more amenable to location of a high-speed rail station. Sites were also perceived to require moderate interagency coordination. Environmental justice issues may or may not be present.

Tier 3: Third tier sites included the remaining 10 sites. These sites had a mixture of land uses, particularly residential, and thus would require significant interagency coordination. Environmental justice/sensitive land issues also seemed to be more common in these areas. Although intermodal connectivity was often good, the benefits were outweighed by the mixed land uses.

C. MINIMIZE OPERATING AND CAPITAL COSTS

Length

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: There is a strong correlation between shorter alignment lengths and lower capital and operating costs. In addition, those alignments that exhibit fewer special track work elements such as turnouts and stub-end segments and those that can take advantage of at-grade construction methods would tend to minimize costs. The capital cost to build each of the alignment options evaluated in this segment have a 25% spread between the lowest and highest cost options. The costs are based on the extensive need for aerial or trench construction methods in this highly urbanized area.

Operational Issues

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: Operationally, there are only minor differences between the alignments in this segment as they follow the same pattern for continuous through travel from west to east. The most significant operational issue is related to the geometry of the alignments. Curves originally laid out for much lower freeway and railroad speeds significantly constrain continuous operating speeds that can be achieved.

Average speed was used as the discriminating element to determine differences among the alignment alternatives. Rail alignments are rated overall better than the freeway and mixed rail/freeway alignments.

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: The station options in this segment are configured parallel to existing track alignments. They will have the same basic operational pattern station and through-tracks to allow express trains to bypass stations. There are no stations in this segment that require stub-end or spur tracks to achieve station access.

Construction Issues

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: Based upon the information developed to date, four methods of constructing the high-speed train system need to be employed. These are described as follows:

At-Grade - This is the most cost-effective method since it relies on laying tracks along the ground with minimal disruption and construction of expensive structural elements. This method is only feasible along portions of the alignments that are in fairly flat terrain, and void of at-grade crossings with roads and other transportation systems. The best opportunities to construct at-grade tracks for steel-wheel-on-steel-rail only are alongside existing railroad corridors through relatively undeveloped areas

Aerial - This method involves constructing a 50- to 60-foot (15.2- to 18.2-meter)-wide structure, 25 to 50 feet (7.6 to 15.2 meters) in the air, standing on center columns. The benefit of this construction method is that other traffic and vehicles could cross or run parallel underneath. This method is possibly the most intrusive visually, although the disruption to the area during construction is minimized since the only excavation necessary is for the column foundations. Construction along freeway alignments would require careful planning to minimize disruption to traffic flow with much activity limited to off-peak hours.

Trench - This method involves depressing the alignment into an excavated trench so that streets and other traffic pass over the high-speed train alignment at their current grade. This removes the high-speed train from sight, but it involves extensive excavation, utility relocation, and construction disruptions to surrounding land uses. It also provides opportunities for landscape treatments and partial decking over of the alignment in places to provide additional shielding and open space once the alignment is completed.

Tunneling - This method would be reserved for the most difficult terrain where grades exceed the allowable system tolerances. It involves the use of tunnel-boring machines (TBMs) or other evacuation techniques to bore through hillsides to create a straight alignment that is capable of maximizing train speeds. This method would be coupled with aerial structures and bridges in some segments to span canyons and rivers.

To minimize construction and maintenance costs, at-grade and trench construction methods would be applied wherever possible. Tunneling and aerial segments involve the highest costs both in construction and long-term maintenance.

In this segment, all significant portions of the construction would be accomplished with the aerial and trench methods. Most likely, all of the freeway alignments would require the exclusive use of aerial construction, with many sections of multilevel structures required to pass over existing overpasses and connector ramps. The freeway alignment options 1.c. and 1.d. would require relocating and maintaining freeway access and capacity during construction.

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: Station construction issues are related to the alignment construction issues in that stations would be placed above-grade when they occur in an aerial segment or below-grade if the station is located along a trench portion of the alignment. In this segment, all stations are likely to be located in an aerial configuration to maintain full separation of the high-speed train system from other transportation facilities. The major differences in construction then relate to the anticipated differences in ridership and patronage levels at various stations that would require enhanced amenities and parking facilities. In addition, those station options that are to be developed at existing stations would have more construction issues related to the relocation of existing station components. On this basis, the Pomona Metrolink Station (Figure 4.1-1), Fullerton Metrolink Station, Riverside, Downtown Metrolink Station (Figure 4.1-2), and downtown San Bernardino Santa Fe Depot station locations would tend to involve more construction issues than other potential station locations.

Capital Cost

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: The capital cost to build each of the alignment options evaluated in this segment have a 25% spread between the lowest and highest cost options. The costs are based on the extensive need for aerial or trench construction methods in this highly urbanized area. The freeway alignment options would reflect the higher costs because of the likely need to use exclusively an aerial configuration. The rail alignment options would have the lowest cost since a variety of construction techniques could be used.

Figure 4.1-1
View of Pomona Metrolink Station

Figure 4.1-2
View of Riverside Downtown Metrolink Station

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: The capital cost for station development relates to the size and amenity configuration of each station. The cost of station options may vary on the basis of the type of station facility as either a terminal or an urban, suburban, or rural location. Figure 4.1-3 depicts an example of a typical suburban station location.

Figure 4.1-3
Typical Suburban Station Location

Right-of-Way Issues/Cost

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: Right-of-way is particularly constrained in this segment due to the built-up nature of the areas that the high-speed train alignments pass through. Right-of-way constraints are more pronounced along the freeway alignments than the rail alignments because the more expensive and built-up areas exist along the freeways. This may lead to higher acquisition costs and protracted negotiations.

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: Rights-of-way at stations are also similarly constrained at existing stations located in or near downtown areas due to extensive development in the vicinity of these transportation hubs. On this basis, the stations with the greatest right-of-way and cost issues in this segment are likely to be the Pomona Metrolink Station, Riverside, Downtown Metrolink Station, and the San Bernardino Santa Fe Depot Station.

D. MAXIMIZE COMPATIBILITY WITH EXISTING AND PLANNED DEVELOPMENT

Land Use Compatibility and Conflicts

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: The six alignments under consideration in the Los Angeles to March ARB segment have a variety of existing land uses as they pass from the city of Los Angeles through communities in the Inland Empire. As these options follow existing transportation corridors, either

freeways or rail, the addition of new high-speed passenger service would be compatible with existing transportation uses. Conflicts would arise as right-of-way is expanded to accommodate the new service in heavily developed urban areas. Appendix C includes detailed GIS maps depicting the existing land use, planned land use, sensitive land uses, and environmental justice issues for this region.

Each of the alignments under study has a number of local parks and schools in their vicinity. All, except the SR-60 Alignment (1.d), have two or more regional hospitals, and are within 0.25-mile (0.4 km) of a regional park. All six options have at least one major public facility in the vicinity. Two of the routes (1.a and 1.f) have a potentially significant conflict with the San Gabriel Mission Historical Site. Figure 4.1-5 depicts sensitive land uses in this segment.

Future planned land uses for these alignments are similar to existing land uses. Conflicts would arise as new uses go into place prior to construction of the proposed project. Figure 4.1-6 shows the planned land use patterns for this segment.

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: The station sites in the Los Angeles to March ARB segment currently support a variety of land uses in their general vicinity. Two of the sites, El Monte west of the I-605 along I–10 and South El Monte west of the I-605 along SR-60, are largely residential with future plans calling for them to remain as such. One other site, San Bernardino Santa Fe Depot, has future plans for the vicinity of the station to transition into a greater commercial/industrial use. Several others are commercial, industrial, or a mix of uses and expected to remain in those general roles. The Pomona Cal Poly, Ontario Airport North and Ontario Airport South, and UP Colton Line/San Bernardino stations have vacant land in their vicinities. Plans call for a variety of future uses but do not appear to be in substantial conflict with the proposed station uses.

Visual Quality Impacts

Alignment 1.a: via UP/Colton

Alternative Alignment 1.a follows one of the two primary UP Railroad lines that are used for freight and passenger service. This corridor is an older, densely urbanized alignment that causes the existing right-of-way to be constrained. Land use directly adjacent to the railroad is primarily industrial and commercial. Along the UP/Colton Railroad Line, there are at least three historical features: the San Gabriel Mission, the Pomona Railroad Station and the Riverside Train Depot. In addition, there are five local, city, and county parks located within 0.5-mile (0.8 km) of this alignment. Between Los Angeles and San Bernardino Counties, the Alameda Corridor East (ACE) agency is in the process of installing grade separations in order to reduce traffic impacts. This will not reduce the visual impacts that the existing train corridor currently presents; however, it indicates a strong desire to reduce conflicts of rail with other community activities. Conceptual or initial engineering proposes that this alignment should be primarily aerial construction or trench. The visual impacts of aerial would be constrained within this narrow corridor on commercial and industrial areas. However, trenching may be preferable to reduce visual quality impacts to the historic structures and park facilities. This corridor has a medium visual quality compatibility on the adjacent land uses and impacts to aesthetic considerations. The “view from” the train is fairly nondescript; however, an aerial structure would maintain light and visual interest to the user whereas a trench would offer minimal visual appeal. Visual quality of this alignment for the train user is considered low.

Alignment 1.b: via UP Riverside

The second UP Railroad Line travels through a similar urbanized environment as the UP Colton Line; however, further south industrial land uses are predominantly adjacent to the corridor. Along the UP Riverside Line, there are two historical features—the Pomona Metrolink Station and the Riverside Train Depot. In addition, there are 12 local, city, and county parks within this corridor adjacent to the alignment. Plans for the ACE corridor also involve grade separations on the UP Riverside Railroad. Due to the industrial land uses along this alignment, visual impacts are perceived as minimal; however, the historical features and presence of parks along the corridor increase the possibility of potential impacts. Similarly, the visual assessment of the user may not be enticing in terms of general landscape, but the presence of historic features and parks increases the visual appeal to a medium valuation.

Alignment 1.c: via I-10

The alignment following I-10 is proposed to be completely aerial and would be located to one side of the freeway. This would considerably reduce the visual quality impacts on the freeway side, causing only incremental visual impacts to the other side. Because the freeway represents a large infrastructure project visible to the community and includes aerial structures and sound walls, the addition of another aerial structure would be compatible within this context. There are no listed historic or cultural features of significance, and there are nine parks that currently are impacted by the freeway. The land uses along this corridor are primarily commercial and industrial. The visual quality impact is medium to high compatibility. The visual quality for the user has low appeal.

Alignment 1.d: via SR-60

Similar to the I-10 alignment, SR-60 traverses an urbanized corridor. However, it also crosses 16 parks including Whittier Narrows Recreation Area, the Puente Hills Golf Course, and several other golf courses. While an additional rail corridor positioned to one side of SR-60 may be a compatible infrastructure, there are significant features that concern visual quality making this a medium compatibility with the adjacent communities. This route is proposed to be aerial, which would have medium- to high-visual appeal for the rider because the terrain and landscape features would be pleasing.

Alignment 1.e: via BNSF/SR 91

The BNSF corridor, much like the UP corridors, is an older, densely urban corridor with primarily industrial land uses adjacent to the railroad. Once this alignment runs next SR-91, the land use changes to a combination of residential and commercial. This alignment does not have any recorded historic features; however, it does include 17 parks. The compatibility along the BNSF corridor is medium due to the density and constraining corridor, but once it connects with SR-91, the impacts to parks and residential land uses reduces the compatibility to a medium to low rating. Conceptual engineering proposes either aerial or trench within the rail corridor and aerial along SR-91. A trench section is not attractive for the user; however, aerial may provide visual access to the 17 parks and varying terrain, such as the Chino Hills State Park and possible views of the Cleveland National Forest. This alignment has medium to low appeal for the user.

Alignment 1.f: via UP Colton/San Bernardino

The alignment via Colton and San Bernardino is an optional alignment to the UP/Colton option where the alignment would veer north in Ontario to connect with the Santa Fe Depot in San Bernardino before continuing south to Riverside. Therefore, the assessment of this alignment is similar to the UP/Colton Line. The differences are that this alignment would potentially have visual impacts on four historic properties (San Gabriel Mission, Pomona Train Depot, San Bernardino Santa Fe Train Station, and

Riverside Train Depot), instead of three, and eight parks. In addition, this alignment would pass by more residential land uses. Therefore, the visual compatibility involves more potential impacts resulting in a medium to low compatibility with the community. The visual appeal to the user is generally low, except for the historic and park features resulting in a medium to low assessment.

Screening for Stations

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: There is minimal information available about the appearance of station locations because each station would be independently developed with the adjoining community and stakeholders. Therefore, the evaluation was based on measuring the ability for the environment to accept a large-scale multimodal transportation center. Factors are the urban scale and the historical significance at the proposed location. See also Table 3.4-1 for assignment of stations by alignment options. Stations are also cross-referenced by option.

El Monte, West of I-605 along the UP Colton Line and I-10
(Alignments 1.a, 1.c, 1.f)
This station is in an older, small-scale developed community and has no historically sensitive features. This station receives a medium visual compatibility.

South El Monte, West of I-605 along SR-60
(Alignments 1.b, 1.d, 1.g)
This station is in an older, small-scale developed community and has no historically sensitive features. This station receives a medium visual compatibility.

Norwalk, Metrolink Station
(Alignment 1.e)
This station is in an older, small-scale developed community and has no historically sensitive features. This station receives a medium visual compatibility.

Fullerton Transportation Center
(Alignment 1.e)
This station is proposed at the Fullerton Transportation Center (historic Santa Fe Depot) where there is older, small-scale development. This station has a low to medium visual compatibility.

City of Industry
(Alignments 1.b, 1.d, 1.g)
This station is in an older, small-scale developed community and has no historically sensitive features. This station receives a medium visual compatibility.

Cal Poly Pomona Station
(Alignment 1.c)
The area surrounding Pomona-Cal Poly Station has a medium-scale development pattern but is still walkable in nature. There are no historically significant features. This station receives a medium to high visual compatibility valuation.

Pomona, Metrolink Station
(Alignments 1.a, 1.b, 1.f, 1.g)
The Pomona station has recently been renovated and is located in an older, downtown setting. Therefore, it is a small-scale environment with historical significance. This train station has a low visual compatibility.

Ontario Airport, Northside
(Alignments 1.a, 1.c, 1.f, 1.g)
Surrounding the Ontario Airport are large-scale commercial and business park development patterns. There are no historically significant features and, therefore, this station has high potential visual compatibility.

Ontario Airport, Southside Metrolink Station
(Alignments 1.b, 1.d)
Surrounding the Ontario Airport are large-scale commercial and business park development patterns. There are no historically significant features and, therefore, this station has high potential visual compatibility.

UP Colton Line / San Bernardino Station
(Alignments 1.a, 1.g)
The Colton Station would be located near a large rail yard, amounting to a large-scale development pattern. There are no historically significant features in this area. The station receives a high visual compatibility valuation.

San Bernardino, Santa Fe Depot
(Alignment 1.f)
The San Bernardino Santa Fe Depot provides historical context to a multimodal train station. This area has a mixture of large-scale development patterns and older downtown, walkable block sizes. This station could have medium visual compatibility.

Riverside Downtown Metrolink Station
(Alignments 1.b, 1.d, 1.e)
The Riverside Metrolink Station has been revitalized with small stores and attractive landscaping around the parking areas. This station has historical significance and medium visual compatibility.

UC Riverside
(Alignments 1.a, 1.b, 1.c, 1.d, 1.g)
The area surrounding the UC Riverside Station has a medium-scale development pattern but is still walkable in nature. There are no historically significant features. This station receives a medium- to high visual compatibility valuation.

March ARB
(Alignments 1.a, 1.b, 1.c, 1.d, 1.e, 1.f, 1.g)
This area is largely undeveloped with no historical features; therefore, a multimodal train station would be highly compatible. This area is included in the redevelopment plans for the base. The station would be visually compatible with planned uses for the site. In addition, the proposed station would offer opportunities for development in the vicinity in keeping with reuse plans for the base.

E. MINIMIZE IMPACTS TO NATURAL RESOURCES

Water Resources

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: Options 1.a (via UP Colton), 1.b (via UP Riverside), 1.c (via I-10), and 1.f (UP Colton/San Bernardino) all traverse urban areas. These proposed alignments would not adversely impact water resources in these areas, as most of the waters are channelized, and lack sensitive habitats. In addition, permanent impairment to beneficial uses is not anticipated. Therefore, a low level of constraint is identified for these urban water body intersections.

A higher level of constraint is assigned relative to options 1.d (via SR 60) and 1.e (via BNSF/SR 91). Option 1.d alignment is proposed through the Whittier Narrows Nature Center, which would impact the water resources within the Nature Center. Both Options 1.d and 1.e potentially would impact the Santa Ana River through Orange and Riverside Counties. Portions of the river in these areas support natural stream channels and associated riparian banks. Option 1.e is also likely to impact the North Fork Coyote Creek and Temescal Creek and their associated wetland habitat. Additional constraints include extreme topography and proximity of proposed alignments to sensitive water resources.

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: (See Table 3.4-1 for a listing of stations by alignment option.)

El Monte West of I-605 Along the UP Colton Line
The location of this proposed station may result in temporary impacts to the San Gabriel River and Walnut Creek. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

El Monte West of I-605 at I-10
The location of this proposed station may result in temporary impacts to the San Gabriel River and Walnut Creek. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

South El Monte, West of I-605 along SR-60
The location of this proposed station may result in temporary impacts to the San Gabriel River, Whittier Narrows and San Jose Creek. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

Norwalk Metrolink Station
This proposed station is not located in proximity to any water body. Any potential impacts to water resources would be minimal. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

Fullerton Metrolink Station
The location of this proposed station may result in temporary impacts to Fullerton Creek and Brea Creek. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

City of Industry Metrolink
The location of this proposed station may result in temporary impacts to Diamond Bar and San Jose Creeks. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

Pomona Metrolink Station
This proposed station is not located in proximity to any water body. Any potential impacts to water resources would be minimal. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

California Polytechnic State University in Pomona (Cal Poly)
The location of this proposed station may result in temporary impacts to San Jose Creek. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

Ontario Airport North
The location of this proposed station may result in temporary impacts to Cucamonga Creek, which is channelized. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

Ontario Airport South Metrolink
This proposed station is not located in proximity to any water body. Any potential impacts to water resources would be minimal. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

Riverside Downtown Metrolink Station
The location of this proposed station may result in temporary impacts to Riverside Canal, which is channelized. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

University of California at Riverside (UC Riverside)
The location of this proposed station may result in temporary impacts to Gage Canal, which is channelized. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

March ARB
This proposed station is not located in proximity to any water body. Any potential impacts to water resources would be minimal. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

Wetlands

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: River crossings support aquatic, wetland, and riparian habitats. As with most river crossings, serious impacts are avoided through spanning the crossing with bridges that, at the most, place support columns in the sensitive wetland and aquatic habitats. Alignments 1.a (via UP Colton), 1.b (via UP Riverside), and 1.f (UP Colton/San Bernardino) traverse urban areas with very little remnant of native wetlands. Therefore, a moderate level of potential impact is identified for these urban water body crossings supporting low quality wetland resources.

A higher level of constraint with this alignment exists relative to Alignments 1.d (via SR-60) and 1.e (via BNSF/SR-91). Alignment 1.d is close to Broadleaf Riparian habitat and associated protected sensitive species (threatened and endangered species of flora and fauna). A swath of riparian habitat at the proposed crossing at Box Springs Road is also identified as a potential constraint for Alignment 1.d. Wetland resources of concern associated with Alignment 1.e include wetlands along the North Fork Coyote Creek, high quality riparian habitat along the Santa Ana River near the Prado Basin, and wetland resources at Temescal Creek.

Floodplain Analysis

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: Alignments 1.a (via UP Colton), 1.b (via UP Riverside), 1.c (via I-10), and 1.f (UP Colton/San Bernardino) are located in Zone X and, therefore, are associated with minimal flood risks. However, Alignments 1.d (via SR-60) and 1.e (via BNSF/SR-91) impact the Santa Ana River floodplain, North Fork Coyote Creek, and Temescal Creeks, which have high beneficial floodplain values. These alignments also would result in longitudinal encroachments. Therefore, Alignments 1.d and 1.e are assigned higher constraint values.

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: (See Table 3.4-1 for a listing of stations by alignment option.)

El Monte, West of I-605 Along the UP Colton Line

This proposed station is located in Zone X, in the floodplains of the San Gabriel River and Walnut Creek. The beneficial floodplain values associated with these floodplains are deemed to be high; however, the proposed station option is still assigned a low constraint due to the fact that potential floodplain impacts easily could be avoided or mitigated by reducing encroachment into the floodplain and by implementing effective construction BMPs.

El Monte, West of I-605 Along I-10

This proposed station is located in Zone X, in the floodplains of the San Gabriel River and Walnut Creek. The beneficial floodplain values associated with these floodplains are deemed to be high; however, the proposed station option is still assigned a low constraint due to the fact that potential floodplain impacts easily could be avoided or mitigated by reducing encroachment into the floodplain and by implementing effective construction BMPs.

South El Monte, West of I-605 Along SR-60

This proposed station is located in Zone X, in the floodplain of the San Gabriel River. The beneficial floodplain values associated with these floodplains are deemed to be high; however, the proposed station option is still assigned a low constraint due to the fact that potential floodplain impacts easily could be avoided or mitigated by reducing encroachment into the floodplain and by implementing effective construction BMPs.

Norwalk Metrolink Station

This proposed station is not located in a major floodplain; therefore, construction of the proposed station is not likely to result in floodplain encroachment. The level of constraint is identified as low.

Fullerton Transportation Center

This proposed station is located in Zone X, in the floodplains of Fullerton Creek and Brea Creek. The level of constraint is identified as low, as the beneficial floodplain values associated this floodplain are considered low and floodplain encroachment is minimal.

City of Industry Metrolink Station

This proposed station is located in Zone X, in the floodplain of San Jose Creek. The level of constraint is identified as low, as the beneficial floodplain values associated this floodplain are considered low and floodplain encroachment is minimal.

Pomona Metrolink Station

This proposed station is not located in a major floodplain; therefore, construction of the proposed station is not likely to result in floodplain encroachment. The level of constraint is identified as low.

Cal Poly Pomona

This proposed station is located in Zone X, in the floodplain of San Jose Creek. The level of constraint is identified as low, as the beneficial floodplain values associated this floodplain are considered low and floodplain encroachment is minimal.

Ontario Airport, North

This proposed station is located in Zone X, in the floodplain of Cucamonga Creek. The level of constraint is identified as low, as the beneficial floodplain values associated with this floodplain are considered low and floodplain encroachment is minimal.

Ontario Airport South Metrolink

This proposed station is not located in a major floodplain; therefore, construction of the proposed station is not likely to result in floodplain encroachment. The level of constraint is identified as low.

Downtown Riverside

This proposed station is not located in a major floodplain; therefore, construction of the proposed station is not likely to result in floodplain encroachment. The level of constraint is identified as low.

UC Riverside

This proposed station is not located in a major floodplain, therefore construction of the proposed station is not likely to result in floodplain encroachment. The level of constraint is identified as low.

March ARB

This proposed station is not located in a major floodplain; therefore, construction of the proposed station is not likely to result in floodplain encroachment. The level of constraint is identified as low.

Threatened and Endangered Species Impacts

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: For the Segment 1 alignment options much of the area is urban with little or no potential impacts to species of concern. Alignment 1.c is close to isolated California gnatcatcher habitat; however, it is likely that impacts could be avoided. Option 1.d is close to broadleaf riparian habitat and associated protected species. River crossings have the potential to impact protected species dependent on riparian and aquatic habitats. Portions of Alignment 1.e are close to habitats for least Bell's vireo and Stephens' kangaroo rat, but impacts to these species can likely be avoided or effectively mitigated. River crossings support aquatic, wetland, and riparian habitats. As with most river crossings, serious impacts are avoided through spanning the crossing with bridges that, at the most, place columns in the sensitive wetland and aquatic habitats. Alignments 1.a, 1.b, 1.f, and 1.g traverse urban areas with very little remnant native vegetation. As a result, these areas do not support habitats for protected species.

F. MINIMIZE IMPACTS TO SOCIAL AND ECONOMIC RESOURCES

Environmental Justice Impacts (Demographics)

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: The degree to which potential environmental justice impacts are present varies by alignment. Analysis identified concentrations of both low- and moderate-income households and ethnic minorities within 0.25-mile of the proposed alignments. The UP Colton (1.a), UP Riverside (1.b), UP Colton/San Bernardino (1.f), the Business Plan (1.g), and I-10 Freeway (1.c) Alignments have a medium range of potential environmental justice issues with a high incidence of minority population concentrations and a medium concentration of low- and moderate-income households. The BNSF/SR-91 Alignment has a similar overall rating with a medium-level concentration of ethnic minorities.

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: Several of the potential station areas evaluated could have environmental justice issues associated with them. Eight station sites in the Los Angeles to March ARB segment were identified as having potential environmental justice issues based upon concentrations of low- and moderate-income and minority populations in the vicinity of the station. Those stations are as follows: El Monte west of the I-605 along I-10, South El Monte west of the I-605 along SR-60, Pomona Metrolink Station, Ontario Airport North, Riverside, Downtown Metrolink Station, UC Riverside, and San Bernardino Santa Fe Depot. The six other stations along this segment are not located in areas identified as being minority or low-income.

Farmland Impacts

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: The alignment options evaluated pass through areas with some level of agricultural production. In the seven alignment options between Los Angeles and March ARB, agricultural land use within 0.25-mile (0.4 km) of the alignment ranges from 319 acres on the I-10 Freeway Alignment (1.c) to 1,123 acres on the UP Riverside option (1.b). However, the presence of farmland in the vicinity of the corridor does not necessarily indicate the level of actual farmland impacts created by any of the alignments. Final analysis of affected area and the disruption of farmland operations would require more detailed analysis following this screening process.

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: Although farmlands can be found within 0.25-mile (0.4 km) of 5 of the 14 potential station sites in the various Los Angeles to March ARB options, none of the station sites would directly impact farmlands.

G. MINIMIZE IMPACTS TO CULTURAL RESOURCES

Cultural Resources Impacts

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB. Starting at LA Union Station (which is part of the Los Angeles Plaza National Register Historic District) all the options have spatial impacts on at least three historic properties except the I-10 and SR-60 alignments. UP/Colton and UP/Riverside have the most impacts because they start at Union Station and travel through an area with high concentrations of cultural resources (including the San Gabriel Mission) that are located to either side of the alignment, but not all of these resources were included in the table because they do not fall within the designated 50-foot (15.2-meter) screening width. Altogether, between the two alignments (UP/Colton and UP/Riverside), there are three impacted historic properties in the city of Pomona, including the Pomona YMCA Building and the Fox Theater. The UP/Riverside Line would potentially impact a historic area at the Riverside Train Depot, where there are a number of historic properties located close to this proposed station, including the Riverside-Arlington Heights Fruit Exchange, which may be directly impacted.

The SR-91 Alignment starts at LA Union Station (in the Los Angeles Plaza National Register Historic District) and impacts three historic properties in this area. This alignment impacts one site in the city of La Mirada and several historic sites in Fullerton, including the Farmers and Merchants Bank and the Fullerton UP Depot, a block before the alignment reaches the Fullerton Transportation Center Station.

Parks and Recreation/Wildlife Refuge Impacts

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: Four alternatives of this corridor segment are anticipated to have significant impacts on parklands. The UP/Riverside option would run adjacent to six parks. The one major potential impact of this alignment is the Santa Ana River Wildlife Area. The alignment runs adjacent to the wild life area for about one mile (1.6 km) and through for about 0.25-mile (0.4 km).

The second alignment option with anticipated significant impacts is the route along I-10. At its starting point in Los Angeles, this alternative is adjacent to and may require 0.25-mile of right-of-way from the El Pueblo de Los Angeles State Historic Park. Another constraint of this alignment would potentially impact approximately one mile (1.6 km) of the Frank G. Bonelli Regional County Park in San Dimas. Additionally, the route would run immediately adjacent to and may require right-of-way from four other local parks. SR-60 is the third alignment of Segment 1 that is expected to have significant impacts on parkland. It would run immediately adjacent to and may require right-of-way from five parks and recreation areas. This alignment would also run through 1.5 miles (2.4 km) of the Whittier Narrows Recreation Area. In Riverside, the alignment would run directly adjacent to 0.25-mile (0.4 km) of the Quail Run Open Space.

The fourth alignment that would have significant impacts is the BNSF/SR-91 Alignment. The major constraint of this option is that it would run along 2.5 miles of Featherly Regional Park in Yorba Linda. Separated only by the Santa Ana River, the option also would also run the length of the 1.5-mile-long Yorba Regional Park. In addition to the two major constraints, this proposed alignment would run immediately adjacent to six community parks.

The UP/Colton Alignment is expected to have moderate impacts because it runs adjacent to five parks. The one major potential impact of this option is that it would extend through 0.125-mile of the Box Springs Mountain Reserve. The San Bernardino portion of the UP Colton/San Bernardino option runs adjacent to two community parks.

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: None of the proposed stations are within or adjacent to parklands. No impacts are anticipated.

H. MAXIMIZE AVOIDANCE OF AREAS WITH GEOLOGIC AND SOILS CONSTRAINTS

Soils/Slope Constraints

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: The soils throughout Segment 1 are primarily alluvium, younger and older fan deposits, non-marine and marine deposits, older lake deposits and in very few cases sedimentary, volcanic, and granitic rocks. In general, a slope can be constructed with a 2:1 ratio. The potential for landslides ranges from low to moderate depending on the topography of the area. In several cases, the alignments would pass through hills and mountains.

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: The geologic and soils constraints of the potential station sites correspond to geologic settings, slopes, and landslides described above for that particular area. UC/Riverside, Downtown Riverside Metrolink Station, Ontario Southside Metrolink Station, Ontario Airport

Northside, Cal Poly Pomona, northeast side of campus, Pomona Metrolink Station, City of Industry Metrolink Station, Fullerton Transportation Center, Norwalk Metrolink Station west of the I-605 in South El Monte, west of I-605 in El Monte on I-10, and west of the I-605 in El Monte on UP Colton display geologic characteristics similar to Segment 1.

Seismic Constraints

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB: The liquefaction potential for alignments within Segment 1 is, in general, moderate to high due to the type of soils present. There are several faults that are near or come in contact with the alignments in Segment 1. The faults that have direct contact with the alignments have a high surface rupture potential. The following list names of faults that come in contact with one or more of the alignments.

- San Jacinto Fault Alignments 1.a, 1.c, 1.e, and 1.f
- Chino Fault Alignments 1.d and 1.e
- Santa Monica Fault Alignment 1.a
- San Jose Fault Alignment 1.c
- Whittier-Elsinore Fault Alignment 1.e

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: The geologic and soils constraints of the proposed station sites for the HIGH-SPEED TRAIN correspond to geologic settings, slopes, and landslides described for that particular area. Northside, Cal Poly Pomona northeast side of campus, Pomona Metrolink Station, City of Industry Metrolink Station, Fullerton Transportation Center, Norwalk Metrolink Station west of I-605 in South El Monte, west of I-605 in El Monte on I-10, and West of the I-605 in El Monte on the UP Colton Line display geologic characteristics similar to Segment 1.

Two station sites are located in close proximity to faults or fault zones. The faults and corresponding stations are:

- San Jose Fault – Cal Poly northeast side of campus
- Workman Hill Fault – Station option west of the I-605 in South El Monte

I. MAXIMIZE AVOIDANCE OF AREAS WITH POTENTIAL HAZARDOUS MATERIALS

Hazardous Materials/Waste Constraints

Alignment Evaluation/Comparison—Los Angeles Union Station to March ARB:

Alignment 1.a. Although 12 generator sites were identified, only 2 release sites that may require further action and 1 transporter site were identified. No potential constraints were identified that would likely screen out this option.

Alignment 1.b. Five generator sites were identified. One of the four release sites identified was listed as a manufactured gas plant (MGP) site. The database indicated that the California Department of Toxic Substances Control (DTSC) considers the MGP site significant. The status of the MGP site was not available from the database. MGP site investigation and cleanup is generally a mature practice, so this site may be not be a significant issue in the future when the Authority seeks to obtain corridor right-of-way. Therefore, the potential constraint is moderate due to the presence of the MGP site.

Alignment 1.c. Only one generator site was identified. No database information was found to suggest that significant constraints exist within this option.

Alignment 1.d. Only one generator and one release site were identified. The release site was listed as a disposal site, but there was no additional information in the database

regarding what was disposed or the status of the site. No potential constraints were identified that would likely screen out this option.

Alignment 1.e. Seven generators and five release sites were identified. According to the database, three of the sites were referred to another agency, although the agency was not identified. One site is on the State of California's Annual Work Plan. Although work at these sites may continue into the future, there was no information to suggest that the potential constraints would likely screen out this alternative. The potential constraints are considered moderate.

Alignment 1.f. Two generators and two transporters were identified. In addition, two release sites were identified. One of the sites was referred to the Regional Water Quality Control Board (RWQCB). Although work at these sites may continue into the future, there was no information to suggest that the potential constraints would likely screen out this alternative. The potential constraints would be moderate.

Station Evaluation/Comparison—Los Angeles Union Station to March ARB: No hazardous waste sites were identified through the GIS database at any of the station location alternatives.

4.1.2 Segment 2: March ARB to Mira Mesa

This segment utilized the I-215/I-15 to traverse the region from March ARB to Mira Mesa. Only two alignment options were developed for this segment due to the geographic and topographic constraints of the terrain. These two options are distinguished by the need for more or less tunneling to traverse the hilly terrain south of Temecula and the need to align the route with the two station options identified in Escondido. Figure 4.1-4 illustrates typical terrain along the I-15 corridor in this segment.

A. MAXIMIZE RIDERSHIP/REVENUE POTENTIAL

Travel Time

Alignment Evaluation/Comparison—March ARB to Mira Mesa: Travel times in this segment do not vary significantly due to geometric similarity of the alignments. The two alignment options differ in the extent of tunneling required to achieve flatter curves and gradients through the segment. The express travel time for the alignment with maximized tunneling (2.a) is projected to be 20.4 minutes and the travel time for the alignment option with minimal tunneling (2 b) is projected to be 20.8 minutes.

Length

Alignment Evaluation/Comparison—March ARB to Mira Mesa: The length of the option is also similar. Alignment 2.a has a total segment length of 70.3 miles (113.1 km) and Alignment 2.b has a total segment length of 71.8 miles (115.6 km).

Population/Employment Catchment

Station Evaluation/Comparison—March ARB to Mira Mesa: All of the stations in this segment fall within a moderately populated area, but one that is experiencing significant growth. The population in this segment living within 10 miles (16.1 km) of a proposed high-speed train station ranges between 400 thousand and 1.0 million people. The highest population densities are found near both of the Escondido station options.

Figure 4.1-4
Terrain Along I-15 Corridor

B. MAXIMIZE CONNECTIVITY AND ACCESSIBILITY

Intermodal Connections

Station Evaluation/Comparison—March ARB to Mira Mesa: The March ARB site was discussed in the previous segment. The Murrieta Hot Springs site is located near the I-215/I-15 Wye and is served by those interstate freeways as well as the local roadway system. This site is also served by the Riverside Transit Authority (RTA) system.

The Temecula/Murrieta Border station site is located adjacent to I-15 near the Westchester interchange and is also served by the local roadway system. This site is also served by the RTA system.

The Escondido station site at the SR-78 and I-15 interchange has direct access to Mission Road, Anderson Drive, and a railroad spur that parallels Mission Road to the south and turns into the station site. The site is located approximately one mile from access to SR-78 at Nordahl Road, and to I-15 at Valley Parkway.

The Escondido station site at the Downtown Transit Center station site has direct access to Centre City Parkway, which it parallels, and to Valley Parkway to the south. One of the advantages of this site is its proximity (0.125-mile [0.2 km]) to the Escondido Transit Center. It is also within 0.25-mile (0.4 km) of a railroad spur that crosses Valley Parkway, west of the transit center. The site is located approximately 3,500 feet (1,064 meters) from the to SR-78/Centre City Parkway interchange, and to the I-15/Valley Parkway interchange.

C. MINIMIZE OPERATING AND CAPITAL COSTS

Length

Alignment Evaluation/Comparison—March ARB to Mira Mesa: The alignment option that minimizes tunneling (Alignment 2.b) was specifically developed to minimize capital costs

by minimizing the need to construct expensive tunnel sections. Alignment 2.b has a total of 8.5 miles (13.7 km) of tunnel. Alignment 2.a is straighter and shorter but more expensive to construct since more tunneling is required. It is also necessary to include a third bore tunnel and seismic chambers at selected locations along the alignment, which tends to increase the cost of construction. Alignment 2.a has 15.7 miles (25.3 km) of tunnels of which, 9.3 miles (15.0 km) is a single tunnel.

Operational Issues

Alignment Evaluation/Comparison—March ARB to Mira Mesa: Operationally, both alignment options in this segment have been developed to maximize operational efficiency without relying on stub-end or spur sections to connect to the station options. Both alignments would allow the desired operating speeds.

Station Evaluation/Comparison—March ARB to Mira Mesa: Station operational issues are also similar at all stations in this segment. All stations are assured to be configured as aerial structures with significant support. Facilities such as parking required.

Construction Issues

Alignment Evaluation/Comparison—March ARB to Mira Mesa: Construction of the two alternative options in this segment differs on the basis of the need for more or less tunneling. It will also be necessary to consider construction staging and equipment storage and marshalling areas since there are large areas of minimally developed and somewhat inaccessible terrain throughout this segment.

Station Evaluation/Comparison—March ARB to Mira Mesa: The only differences in station construction issues for this segment relate to the fact that both Escondido station locations are in heavily developed areas. Furthermore, the Escondido Transit Center station option would require the integration of the new high-speed train station into the existing transit facility configuration and operation.

Capital Cost

Alignment Evaluation/Comparison—March ARB to Mira Mesa: The capital cost of the two alignments in this segment would be higher for Alignment 2.a. by $1.0 billion due to the need for more frequent and longer tunnels.

Station Evaluation/Comparison—March ARB to Mira Mesa: The capital cost for station development relates to the size and amenity configuration of each station.

Right-of-Way Issues/Cost

Alignment Evaluation/Comparison—March ARB to Mira Mesa: The two alignment options for this segment generally do not differ greatly in terms of right-of-way issues and costs.

Station Evaluation/Comparison—March ARB to Mira Mesa: The station options in this segment differ in that the Escondido Transit Center location may have more right-of-way constraints than the SR I-78/I-15 station location option due to existing land use and future growth potential. In addition, the border location for the Temecula/Murrieta station may no longer be available due to development pressures in the area.

D. MAXIMIZE COMPATIBILITY WITH EXISTING AND PLANNED DEVELOPMENT

Land Use Compatibility and Conflicts

Alignment Evaluation/Comparison—March ARB to Mira Mesa: This segment extends from Riverside to Mira Mesa. In the northern portion in Riverside County the alignment

extends through largely open landscape with concentrations of mixed urban development in Perris, Murrieta, and Temecula. Uses include commercial and/or industrial activities at freeway interchanges with residential development further from those exits. The alignments are generally on or adjacent to existing transportation corridors—rail or highway.

Although there are a number of local parks and schools near the proposed alignments, there does not seem to be any substantial conflict with sensitive land uses in this part of the segment.

Future development considerations could be important in this corridor. The Inland Empire, and specifically western Riverside County, is one of the fastest growing areas in Southern California. The future land use plans for the area show substantial growth and development along the segment and the proposed redevelopment of March ARB increases the likelihood of future impacts. Based upon the development planned and its pace, there could be a much higher degree of conflict with land use in the area in the future than there is currently.

Little existing development occurs along much of this segment, and most of that is avoided by the tunnel portion of the proposed alignments. However, there are two dwellings that are located approximately 0.3-mile (0.5 km) south of the Riverside County line, and south of Rainbow Glen Road, that would likely be removed by the at-grade portion of the high-speed train alignment.

Alignment 2.a would be in tunnel through the most developed portion of the Rainbow community. However it is anticipated that nine dwellings would be lost along the 1.9 miles (3.1 km) where the alignment is at grade or on aerial structure.

Approximately 11 miles of the 12.6-mile (20.3 km) length of the proposed alignment would be in tunnel, thus avoiding land use conflicts. However, low-density residential uses would be lost in the Hidden Meadows and Old Castle Road area. The alignment would also cross approximately 0.3-mile (0.5 km) of agricultural land.

Alignment 2.a would pass through Escondido west of I-15. Only two miles (3.2 km) of the 12.6-mile (20.3 km) length of the alignment in this area would be in tunnel, thereby avoiding land use conflicts. The remaining 10.6 miles (17 km) of the alignment that are located at-grade, in a trench or elevated, pass through 5.4 miles (8.7 km) of residential land uses, representing a substantial potential loss of existing housing. In addition, approximately one-mile (1.6 km) of commercial and industrial uses are crossed southwest of the intersection of SR-78 and I-15. The alignment also crosses San Dieguito River Park, a Joint-Powers Authority facility, located just north of Rancho Bernardo.

Alignment 2.b would pass through Escondido, running parallel to Alignment 2.a on the eastern side of I-15. The segment is 12.4 miles (20 km) in length, with a tunnel portion that is 4.4 miles (7.1 km) long. The remaining eight miles (12.9 km), located at-grade, in a trench, or elevated, would pass through residential land uses, industrial land uses, Escondido's Kit Carson Park, and the North County Fair regional shopping center. The alignment would cross major commercial structures within the mall. The alignment would cross San Dieguito River Park, a Joint-Powers Authority facility, located just north of Rancho Bernardo. The alignment would also pass along the eastern side of Escondido's Rod McLeod Park, northeast of El Norte Parkway and I-15. The alignment would also cross 2.37 miles (3.8 km) of roadways, including SR-78, Bear Valley Parkway, and multiple crossings of Centre City Parkway.

The alignments would then pass through the Rancho Bernardo, Carmel Mountain Ranch, Sabre Springs, and Miramar Ranch North communities. The majority of the alignment would be in tunnel. The 1.4 miles (2.3 km) located at-grade, in a trench, or elevated are in a continuous section that runs through the Carmel Mountain Ranch Community. This aboveground section passes through residential and commercial land uses, along the Avenue of Science, and in Price Club Plaza and Carmel Mountain Plaza. The aboveground section also passes directly through the main U.S. Post Office for the San Diego region. This is a major constraint.

Station Evaluation/Comparison:—March ARB to Mira Mesa

Temecula at the I-15 and I-215 Wye Station

The Temecula Station is proposed for an area currently developed with a mix of commercial and industrial uses. The station site could potentially interfere with existing land uses depending upon actual siting.

Planned Land Use: Local plans call for a continuation of the commercial/industrial mix of uses already being developed. These should continue to be compatible with the station facility.

Redevelopment Potential: There is a potential for some redevelopment activity in the vicinity of the station site.

Temecula/Murrieta Border Station

The Temecula/Murrieta station site is located in a largely vacant area between the developed core areas of Murrieta and Temecula. The station should not conflict with existing land uses.

Planned Land Use: This is an area of high-expected growth. Future land uses are proposed as a mix of commercial and industrial uses. The station should be compatible with any of these planned uses.

Redevelopment Potential: As a largely undeveloped area, the potential for future development compatible with the station facility is anticipated to be high.

Escondido at the SR-78/I-15 Interchange Station

This Escondido Station site cuts diagonally across the existing street grid, and impacts several existing industrial and commercial operations on the West Side of I-15. Ten or more existing buildings would have to be removed to make way for the station.

Planned Land Use: There is no vacant land at the station site or nearby. However, the *Escondido General Plan* shows that the area is designated for General Industrial and Planned Industrial uses.

Redevelopment Potential: While there is little vacant land at the station site or in the vicinity, the site is within the boundaries of the City of Escondido Redevelopment Project. It is possible that the construction of a High-speed train station at this site would spur redevelopment and development intensification in the area.

Escondido at the Downtown Transit Center Station

This Escondido station site follows the existing street grid east of I-15 at the Transit Center. However, there is no vacant land at the site, and the proposed station would impact several existing industrial and commercial operations. An Escondido fire station is located west of the site, north of Escondido Creek. Eight or more existing buildings would have to be removed to make way for the alternative station.

Planned Land Use: There is no vacant land at the station site or nearby. However, the *Escondido General Plan* shows that the area is designated for Planned Industrial and Specific Planning Area #9.

Redevelopment Potential: While there is little vacant land at the station site or in the vicinity, the site is within the boundaries of the City of Escondido Redevelopment Project. It is possible that construction of a High-speed Train station at this site would spur redevelopment and development intensification in the area.

Mira Mesa Station

The Mira Mesa station site was vacant in 1999, but many new single-family and multiple-family dwellings have been developed in the vicinity since then. Furthermore, the topography at the site is difficult.

Planned Land Use: All the undeveloped land in the vicinity of the site is designated for single-family and multiple-family residential use.

Redevelopment Potential: The site and vicinity are in the process of initial development at this time. No redevelopment area has been designated or is contemplated by the City of San Diego.

Visual Quality Impacts

Alignment Evaluation/Comparison—March ARB to Mira Mesa:

Alignment 2.a Minimize Grade

There are no historic features; however, there are significant agricultural/open space aesthetic qualities and nine designated parks along the route. A mixture of residential communities and business development parks meet near I-15. On this alignment, impacts to visual quality are cuts and fills on the hillsides and aerial structures over dominant landscape features such as Lake Hodges. In general, the intent of this alignment is to share the corridor with the freeway structures, thereby putting the High-speed Train in the most compatible location for the community. However, between Temecula and Mira Mesa, the corridor must divert from I-15 in tunnels and aerial structures, possibly impacting the visual quality of the Nerriam Mountains and the San Bernardino Mountains. Because this alignment minimizes grades, it best preserves the visual compatibility to adjacent environs by following the freeway corridor and maximizing tunnels. The visual valuation is, therefore, medium to high with the surrounding communities. Conversely, because this option involves extensive tunneling, it reduces the visual appeal to a low valuation for train users in an otherwise attractive corridor.

Alignment 2.b Maximize Grade

Alignment 2.b maximizes the grades resulting in fewer tunnels along generally the same alignment as option 2.a. The visual compatibility with the community from March ARB to Murrieta Hot Springs remains medium to high. However, closer to Mira Mesa, the possibility of reduced tunneling causes more potential visual impacts in terms of cut and fill and aerial structures, resulting in a medium to low compatibility. The result is a medium visual compatibility. Again, the community's loss in compatibility is the user's gain. The reduction of tunnels opens improved viewsheds; therefore, this option has a medium to high visual appeal.

Station Evaluation/Comparison—March ARB to Mira Mesa:

Temecula, at the I-15 and I-215 Wye

This area has typical medium-scale suburban development patterns with no historical features. This multimodal station represents a medium- to high-visual compatibility.

Temecula-Murrieta Border
This area has typical medium-scale suburban development patterns with no historical features. This multimodal station represents a medium- to high-visual compatibility.

Escondido at the Downtown Transit Center
This area has typical medium-scale suburban development patterns with no historical features. This multimodal station represents a medium- to high-visual compatibility.

Escondido at the SR 78 and I-15 Interchange
This area has typical medium-scale suburban development patterns with no historical features. This multimodal station represents a medium- to high-visual compatibility.

Mira Mesa
This area is largely undeveloped with no historical features; therefore, a multimodal train station will be highly compatible.

E. MINIMIZE IMPACTS TO NATURAL RESOURCES

Water Resources

Alignment Evaluation/Comparison—March ARB to Mira Mesa: For Segment 2, options 2.a (minimize grade/maximum tunnels) and 2.b (maximize grade with minimum tunnels) would impact the same water resources. In terms of potential impacts, some of the significant water resources include: San Jacinto River, Murrieta Creek, Los Alamos Creek, Santa Margarita River (Temecula Canyon Creek), Rainbow Creek, San Luis Rey River, Lake Hodges (San Dieguito River), Keys Creek, Chicarita Creek, and Penasquitos Creek. Most of these resources support quality wetlands, which are habitat for sensitive plant and animal species. Although the proposed alignments potentially impact the same resources, the constraint for option 2.a is assigned a lower (moderate) level due to the fact that this option allows construction of maximum tunnels, which may be designed to avoid directly impacting sensitive water resources. Combination of tunnels and bridges to span water-sensitive resources would greatly reduce the severity of impacts to these resources. In addition, option 2.a involves minimized grading, which lessens potential impacts due to erosion and subsequent water quality degradation.

Station Evaluation/Comparison—March ARB to Mira Mesa

Temecula at the I-15/I-215 Wye
This proposed station is not located in proximity to any water body. Any potential impacts to water resources would be minimal. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

Temecula/Murrieta Border
The location of this proposed station may result in minimal, temporary impacts to Santa Gertrudis River and Murrieta Creek. However, the level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

Escondido at the Downtown Transit Center
This proposed station is not located in proximity to any water body. Any potential impacts to water resources would be minimal. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

Mira Mesa
The location of this proposed station may result in minimal, temporary impacts to Second San Diego Aqueduct. However, the level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

Floodplain Impacts

Alignment Evaluation/Comparison—March ARB to Mira Mesa
In Segment 2, options 2.a (minimize grade/maximum tunnels) and 2.b (maximize grade with minimum tunnels) occur in Zone X. However, the natural beneficial floodplain values of water resources traversed by these alignments are high. These floodplain resources include: San Jacinto River, Murrieta Creek, Los Alamos Creek, Santa Margarita River (Temecula Canyon Creek), Rainbow Creek, San Luis Rey River, Lake Hodges (San Dieguito River), Keys Creek, Chicarita Creek, and Penasquitos Creek. Both options also result in transverse encroachments. Therefore, these proposed alignments have higher levels of constraint assigned.

Station Evaluation/Comparison—March ARB to Mira Mesa

Temecula at the I-15/I-215 Wye
This proposed station is not located in a major floodplain; therefore, construction of the proposed station is not likely to result in floodplain encroachment. The level of constraint is identified as low.

Temecula/Murrieta Border
This proposed station is located in Zone X, in the floodplain of Santa Gertrudis River and Murrieta Creek. The beneficial floodplain values associated with these floodplains are deemed to be high; however, the proposed station option is still assigned a low constraint due to the fact that potential floodplain impacts could be easily avoided or mitigated by reducing encroachment into the floodplain and by implementing effective construction BMPs.

Escondido at the SR-78 and I-15 Interchange
This proposed station is located in Zone X, in the floodplain of Escondido Creek. The level of constraint is identified as low, as the beneficial floodplain values associated with this floodplain are considered low and floodplain encroachment is minimal.

Escondido at the Downtown Transit Center
This proposed station is located in Zone X, in the floodplain of Escondido Creek. The level of constraint is identified as low, as the beneficial floodplain values associated with this floodplain are considered low and floodplain encroachment is minimal.

Mira Mesa
The proposed station is located in Zone X, in the floodplain of the San Diego River. The level of constraint is identified as low, as the beneficial floodplain values associated with this floodplain are considered low and floodplain encroachment is minimal.

Wetland Impacts

Alignment Evaluation/Comparison—March ARB to Mira Mesa: For Segment 2, both options would impact the same wetland resources and, therefore, have the same associated constraints. Avoidance of impacts to wetlands resources for Option 2.a (minimize grade with maximum use of tunnels) may be achieved by siting tunnels away from such resources, while avoidance for Option 2.b (maximize grade with minimum use of tunnels), may be achieved by spanning wetland resources with bridges. However,

comparing the avoidance strategies that may be implemented for the options, Option 2.b has a greater level of constraint associated with it, as construction of bridges over large wetland resources could potentially result in a higher degree of adverse environmental impacts.

The potential for the occurrence of vernal pools throughout most of the area along proposed Segment 2 in western Riverside County, sometimes associated with lands classified as agriculture, is a constraint. Vernal pools are dynamic, ephemeral systems that appear or disappear, depending upon seasonal changes influencing the hydrology at a given place. Vernal pools may lack one or all three wetland criteria (hydrology, hydrophytic vegetation, and hydric soils) at any time during any season. Therefore, a specific analysis aimed at identifying the presence of vernal pools within this region would be necessary to determine constraints more specifically.

The following are wetland resources that are particularly significant by virtue of their functions and values: Santa Margarita River (Temecula Canyon Creek), San Luis Rey River, and Lake Hodges (San Dieguito River). These wetland resources also potentially support various sensitive flora and fauna.

Threatened and Endangered Species Impacts

Alignment Evaluation/Comparison—March ARB to Mira Mesa: The use of tunneling for options in Segment 2 would avoid many but not all potential impacts to protected species habitat. This is especially true for river crossings.

F. MINIMIZE IMPACTS TO SOCIAL AND ECONOMIC RESOURCES

Environmental Justice Impacts (Demographics)

Alignment Evaluation/Comparison—March ARB to Mira Mesa:

The proposed alignments in the March ARB to Mira Mesa segment would not affect any areas having a high proportion of minority populations, ethnic or low-income households.

However, several areas of affordable housing would be effected under the alignment options being studied under this subsection. The alignment results in the removal of a number of rural scattered site residences. Substantial losses of housing will occur with approximately 6 to 7 miles (9.7 to 11.3 km) of the alignment passing through residential neighborhoods.

Station Evaluation/Comparison—March ARB to Mira Mesa: The proposed March ARB, Murrieta, Temecula, and Escondido station sites would not affect any known ethnic or low-income neighborhoods.

Farmland Impacts

Alignment Evaluation/Comparison—March ARB to Mira Mesa: The alignment options evaluated from March ARB to Escondido pass through areas with some level of agricultural production. However, the presence of farmland in the vicinity of the corridor (0.25 miles) does not necessarily indicate the level of actual farmland impacts created by any of the alignments. Final analysis of affected acres and farmland operation severances would require more detailed analysis following this screening process.

The proposed alignments in the Escondido to Mira Mesa subarea would not affect any existing farmland areas in active production.

Station Evaluation/Comparison—March ARB to Mira Mesa: The proposed station sites in this segment would not directly affect any identified farmlands.

G. MINIMIZE IMPACTS TO CULTURAL RESOURCES

Cultural Resources Impacts

Alignment Evaluation/Comparison—March ARB to Mira Mesa: There are no impacts to historic properties with either alignments or stations in this corridor segment.

Parks and Recreation/Wildlife Refuge Impacts

Alignment Evaluation/Comparison—March ARB to Mira Mesa: Alignment 2.b would have more impacts to parklands than the minimized grade. The maximized grade alternative is expected to have high impacts because it would run through the Rancho Acacias Park in Murrieta, through one mile (1.6 km) of the Kit Carson Park in Escondido, and through about three miles (4.8 km) of the Santa Margarita Ecological Reserve. In addition, this option is expected to run adjacent to or almost adjacent to four other local parks.

Alignment 2.a is expected to run through the Alta Murrieta Sports Park in Murrieta and about 0.25-mile (0.4 km) of the Felicia County Park in Escondido. This option is also expected to run adjacent to two additional community parks.

Station Evaluation/Comparison—March ARB to Mira Mesa: None of the proposed stations are within or adjacent to parklands. No impacts are anticipated.

H. MAXIMIZE AVOIDANCE OF AREAS WITH GEOLOGIC AND SOILS CONSTRAINTS

Alignment Evaluation/Comparison—March ARB to Mira Mesa: This segment is geologically divided into two sections: 1) March ARB to just north of Pomona Valley, and 2) Temecula to Mira Mesa. The two alignments in the section from Temecula to Mira Mesa were analyzed for maximizing or minimizing tunnels in those particular areas. The two sections are physically divided by the Elsinore Fault Zone that resides just south of the Paoma Valley and just north of Temecula.

The soils from March ARB to just north of the Paoma Valley consist primarily of alluvium. In this northern section of the segment, a slope ratio of 2:1 generally can be constructed. There is a moderate potential for landslides to the west of the alignment where there is a rise in topography and there is a low potential for landslides to the east of the alignment where the topography appears to be relatively level.

The soils, landslide potential, and slope for the section from Temecula to Mira Mesa are described as follows:

Alignment 2.a: Maximize Tunnels

The soils and bedrock consist of some deposits of marine sediments, older lake deposits and metavolcanic rock, but primarily of granite. A slope ratio of 2:1 can be constructed, in general. However, a steeper slope gradient is feasible where granitic rock is present. Because this alignment passes over the California Batholith there are various rises in topography. There is a low to moderate potential for landslides because of this.

With the exception of the San Luis Rey River and surrounding floodplain, the granite in this alignment provides for a potentially suitable environment for the construction of tunnels, depending on the physical quality of the bedrock.

Alignment 2.b: Minimize Tunnels

The soils and bedrock consist of some deposits of marine sediments, older lake deposits and metavolcanic rock, but primarily of granite. A slope ratio of 2:1 can be constructed, in general. Because this alignment passes over the California Batholith, there are various rises in topography. However, a steeper slope gradient is feasible where granitic rock is

present. There is a moderate to high potential for landslides because of this. This alignment follows I-15, and it has a seven-mile stretch through the South Fork Moosa Canyon and, therefore, does not need tunnels.

The seismic constraints for the section from Temecula to Mira Mesa are described as the following:

Alignment 2.a: Maximize Tunnels
There are no apparent faults that are near or come in contact with Alternate Alignment 2.a other than the Elsinore Fault zone to the north. Surface rupture potential is high for the area within the Elsinore Fault Zone. Due to the granitic geology, the potential for liquefaction is low.

Alignment 2.b: Minimize Tunnels
There are no apparent faults that are near or come in contact with Alignment 2.b other than the Elsinore Fault zone to the north. The surface rupture potential is high for the area within the Elsinore Fault Zone. Due to the granitic geology, the potential for liquefaction is low.

I. MAXIMIZE AVOIDANCE OF AREAS WITH POTENTIAL HAZARDOUS MATERIALS

Hazardous Materials/Waste Constraints

Alignment Evaluation/Comparison—March ARB to Mira Mesa:

Only one release site was identified for both alignments 2.a and 2.b for a agricultural chemical company. No database information was found to suggest that significant constraints exist within this option.

Station Evaluation/Comparison—March ARB to Mira Mesa: No hazardous waste sites were identified based on the GIS data review at any of the station location options.

4.1.3 Segment 3: Mira Mesa to San Diego

This segment is generally defined by the various options available to traverse the heavily developed and growing communities of suburban and urban San Diego.

A. MAXIMIZE RIDERSHIP/REVENUE POTENTIAL

Travel Time

Alignment Evaluation/Comparison—Mira Mesa to San Diego: Travel times in this segment vary according to the destination and routing for each of the alignment options studied. The six alignment options generally differ in their ultimate destination and whether they are connecting to downtown San Diego, terminating at Qualcomm Stadium, or connecting into the LOSSAN corridor. Similar to the situation found in Los Angeles County, all of the alignment options traverse heavily developed and constrained areas of residential, commercial, and industrial development as well as environmentally sensitive lands that restrict the ability to design a geometric alignment that can achieve true high-speed operation. The express travel time for the Carroll Canyon Alignment (3.a) is projected to be 14.1 minutes; for the Miramar Road Alignment (3.b), 13.5 minutes; for the SR-52 Alignment to the Santa Fe Depot (3.c), 12.2 minutes; for the I-15/SR-163 to Santa Fe Depot Alignment (3.d), 7.1 minutes; the I-15 to Qualcomm Stadium Alignment (3.e), 4.2 minutes; and the I-15 to SR-163 to I-8 to Santa Fe Depot Alignment (3.f), 9.5 minutes.

Length

Alignment Evaluation/Comparison—Mira Mesa to San Diego: The lengths of the six alignments in this segment also differ depending on their routing and destination. The most direct routes are the I-15/SR-163 to Santa Fe Depot (3.d) and the I-15 to Qualcomm Stadium Alignment (3.e). The other alignments generally divert to the west and traverse a longer distance in order to connect to the LOSSAN corridor before heading south to the Santa Fe Depot in downtown San Diego. The length of Alignment 3.e to Qualcomm Stadium is the shortest, as it stops at Qualcomm Stadium in East Mission Valley and does not extend to downtown San Diego.

Population/Employment Catchment

Station Evaluation/Comparison—Mira Mesa to San Diego: San Diego is a densely populated area of Southern California and a major metropolitan center. The population densities that exist within a 10-mile (16-km) radius of the potential station locations in this segment range from 500 thousand to 1.2 million people.

B. MAXIMIZE CONNECTIVITY AND ACCESSIBILITY

Intermodal Connections

Station Evaluation/Comparison—Mira Mesa to San Diego: The Mira Mesa station site has direct access to Scripps Ranch Boulevard, and thus to Mira Mesa Boulevard. It is located less than one-half mile (0.8 km) from the I-15 Mira Mesa Boulevard interchange, and is approximately 0.75-mile (1.2 km) from the park-and-ride lot on Mira Mesa Boulevard. The nearest existing railroad spur is located approximately three miles (4.8 km) to the southwest, near Miramar Road and Camino Ruiz. There is no existing light-rail transit along I-15, but SANDAG is considering increased bus transit service along I-15.

The Kearny Mesa station site has direct access to Convoy Street, Kearny Mesa Road and Linda Vista Road. Access to the freeway system would be at Mesa College Drive or Balboa Avenue, each less than one-mile (1.6 km) from the site. Montgomery Field, a business airport, is located less than one-mile (1.6 km) away. The nearest railroad facilities are located more than 3.6 miles (5.8 km) to the west, parallel to I-5.

The Qualcomm Stadium site has direct access to Friars Road, San Diego Mission Road, and Mission Village Drive. Access to I-15 is available from Friars Road (0.25-mile [0.4 km]). The site is already served by an existing light rail station. Figure 4.1-5 shows the Qualcomm Station site with the San Diego Trolley intermodal connection. Montgomery Field, a business airport, is located less than three miles (4.8 km) away. All of the Alignments in this segment except the Qualcomm Alignment (3.e), would connect to downtown San Diego at Lindberg field or the Santa Fe depot or possibly both locations.

Figure 4.1-5
Intermodal Connection at Qualcomm

C. MINIMIZE OPERATING AND CAPITAL COSTS

Length

Alignment Evaluation/Comparison—Mira Mesa to San Diego: None of the alignment options stands out as having a significant difference in terms of length and its effect on minimizing costs other than Alignment 3.e, which stops short of downtown San Diego at Qualcomm Stadium. The second most direct route that connects to downtown would also require a significant tunnel section to avoid disturbing Balboa Park and does not result in any cost savings or cost efficiency.

Operational Issues

Alignment Evaluation/Comparison—Mira Mesa to San Diego: The operation of a high-speed train system along these alternative alignments differs mainly in how the terminal station is configured. The larger amount of space available at Qualcomm Stadium allows for more operational flexibility and makes Alignment 3.e somewhat easier to maintain efficient operations. Alternatives 3.d and 3.e perform best with the highest average speeds through this segment.

Station Evaluation/Comparison—Mira Mesa to San Diego: Operationally, the station options in this segment differ in that the Qualcomm Stadium Station would be designed as a terminal station and the optional Kearny Mesa Station is an interim station. The connection through to the LOSSAN corridor allows for the connection of the high-speed train system to downtown San Diego at the Santa Fe Depot. This downtown location, while an attractive option, is much more constrained, with development on all sides and the waterfront nearby making the development of a terminal station somewhat more problematic.

Construction Issues

Alignment Evaluation/Comparison—Mira Mesa to San Diego: The construction of any of the alignment options in this segment would involve sophisticated construction management techniques to minimize the impact of the construction activities on surrounding land uses. All of the alignments considered are located near sensitive land uses and in some cases, restricted areas near the MCAS Miramar. Of the six options, Alignment 3.a through Carroll Canyon appears to avoid the airbase but would impact significant industrial, commercial, and residential uses as well as the El Camino Cemetery while connecting with the LOSSAN corridor and downtown San Diego. Alternative 3.e to Qualcomm Stadium seems to have the least number of construction issues due to the fact that it is located near I-15 and terminates at the relatively open area near Qualcomm Stadium.

Station Evaluation/Comparison—Mira Mesa to San Diego: It is relatively easier to build a station at either Kearny Mesa or Qualcomm Stadium rather than in downtown San Diego. Since both Kearny Mesa and Qualcomm serve different functions, there are no meaningful discriminating characteristics for station construction issues in this segment.

Capital Cost

Alignment Evaluation/Comparison—Mira Mesa to San Diego: Construction costs vary by up to 70% among the Segment 3 alignment options. For example, Alternative 3.e. would be the most cost effective, since this option has a much shorter distance to reach its terminal station, Qualcomm Stadium.

Station Evaluation/Comparison—Mira Mesa to San Diego: Station options in this segment are not really comparable in that the Kearny Mesa Station would be configured as an interim "local" station and the Qualcomm Station site is to be designed as a terminal station.

Right-of-Way Issues/Cost

Alignment Evaluation/Comparison—Mira Mesa to San Diego: Right-of-way is constrained in this segment with all of the alignment options potentially infringing on the adjacent property that is already densely developed. In addition, it has been assumed that none of the alignment options in this segment have the capability to use the existing freeway median since it is either already in use as HOV, special-use lanes, or there are existing plans to do so in the near future.

Station Evaluation/Comparison—Mira Mesa to San Diego: All station locations in this segment are located in already-developed areas at Kearny Mesa, Qualcomm Stadium, and downtown San Diego. The Qualcomm Stadium site has the most physical space of any station site in this segment that could be utilized for the development of a terminal station. The potential downtown station at the Santa Fe Depot has the greatest number of issues regarding the availability of right-of-way and costs associated with station development.

D. MAXIMIZE COMPATIBILITY WITH EXISTING AND PLANNED DEVELOPMENT

Land Use Compatibility and Conflicts

Alignment Evaluation/Comparison—Mira Mesa to San Diego: The alignments in the Mira Mesa area run at-grade, in a trench or elevated for their entire length. This alignment's northern portion consists of the Mira Mesa Station, which is located in the Miramar Ranch North Community. The alignment then extends another 0.3-mile (0.5 km) to the south, crossing an area that is now developed with residential land uses. City of San Diego

Planning Department personnel (Halbert, 2001) objected to this station location because it is not really within the community. The City would prefer a station located to the southwest, west of I-15, perhaps near Miramar Community College.

The alignment extends southwesterly from the eastern side of I-15, through the community of Mira Mesa and into the southern portion of Sorrento Mesa, where it would end at the Coaster tracks that cross Miramar Road. The entire alignment runs at-grade, in a trench, or elevated. It would cross three community centers, including Scripps Mesa Village, San Diego Miramar Community College, and Hourglass Field Community Park. Alignment 3.a runs through Carroll Canyon for approximately one-mile (1.6 km). In Carroll Canyon, the facility faces potential conflicts with existing aggregate extraction operations and the El Camino Cemetery.

Alignment 3.b diverges from Alignment 3.a and runs southwesterly from the eastern side of I-15, through the southeastern portion of Mira Mesa and then parallel along the northern boundary of Miramar Road. The 5.3-mile (8.5-km)-long alignment would be located at-grade, in a trench, or elevated for its entire length. It crosses 0.35-mile (0.6 km) of residential land uses in Mira Mesa, 2.1 miles (3.4 km) of commercial land uses, mostly along Miramar Road, and 0.4-mile (0.6 km) of industrial uses, also along Miramar Road. Several tall buildings (four-stories or more) are located along this alignment along Miramar Road. In addition, the alignment could result in the removal of a new City of San Diego Fire Station located at Maya Linda and Black Mountain Road.

Alignment 3.d, the southernmost alignment, runs from Friars Road in the north to the Santa Fe Depot in the south. It is 4.4 miles (7.1 km) in length, with 1.6 miles (2.6 km) of total underground track and 2.8 miles (4.5 km) of total track at-grade, in a trench or elevated. This segment would cross key roadways, including the I-8/SR-163 interchange and many streets in the downtown area. This alignment also passes within 1.1 miles (1.8 km) of commercial land uses in uptown and downtown San Diego, including many of the region's most prestigious and expensive high-rise buildings. The alignment would tunnel under Balboa Park, the City of San Diego's largest community park.

Alignment 3.e runs 8.9 miles (14.3 km) in length, and extends from Scripps Miramar Ranch in the north to Mission Valley in the south. Underground sections would total 2.2 miles (3.5 km) in length and aboveground sections would total 6.7 miles (10.8 km). The alignment passes through Scripps Ranch High School (but no structures). It also crosses 3.7 miles (6.0 km) of MCAS Miramar, 0.4-mile (0.8 km) of residential land uses in Scripps Miramar Ranch and Tierrasanta (the latter military housing), and 0.7-mile (1.1 km) of industrial uses in Scripps Miramar Ranch and Mission Valley. The alignment also crosses several roadways, including SR-52, Aero Drive, I-15, and Friars Road. This alignment terminates in the Qualcomm Stadium parking lot in Mission Valley at the Qualcomm Station option.

Alignment 3.f runs in a north-south direction, parallel to I-15. The entire alignment would be located at-grade, in a trench, or elevated. The alignment crosses commercial/ industrial land uses in the northeastern corner of the Scripps Miramar Ranch Community. It also passes through Scripps Ranch High School, some industrial land uses in the Scripps Miramar Ranch Community, and MCAS Miramar, although apparently no buildings would be affected.

Alignment 3.f then runs southeasterly through MCAS Miramar and into the Clairemont Mesa Community. The alignment crosses MCAS Miramar land and a portion of residential land uses in the Clairemont Mesa Community. It also passes intermittently through Marian Bear Memorial Natural Park and through several roadways, including I-15, Kearny Villa Road, I-805, Genesee Avenue, Regents Road, and SR-52.

Alignment 3.f continues in a north-south direction through MCAS Miramar, Kearny Mesa, and Linda Vista. The segment's 7.6-mile (12.2-km) length would be located underground for 3.0 miles (4.8 km) and at-grade, in a trench, or elevated for the remaining 4.6 miles (7.4 km). The aboveground section would cross 1.85 miles (3.0 km) of MCAS Miramar and then 2.1 miles (3.4 km) of commercial/industrial land uses, mostly in the Kearny Mesa community. The segment would also cross one-mile (1.6 km) of residential land uses in the Linda Vista Community and 0.35-mile (0.6 km) of roadways, including I-15, Kearny Villa Road, Clairemont Mesa Boulevard, Balboa Avenue, and Genesee Avenue. The Kearny Mesa Station is also located along Alignment 3.d, which is being discussed here in this area. During the reconnaissance, numerous communications towers and antennas were noted in the Kearny Mesa area. The extent of potential interference with these uses is unknown, but should be studied in subsequent analyses.

Alignment 3.f then runs in a westerly direction, parallel to I-8, passing through 0.67-mile (1.1 km) of commercial land uses, including Fashion Valley Mall and the Town and Country Hotel. The alignment passes through one or more parking structures at the East end of Fashion Valley Mall, the largest commercial shopping center in the San Diego region. It also passes through Riverwalk Golf Course and the San Diego River Floodway. It is anticipated that there would be substantial environmental issues to be overcome along this alignment.

Station Evaluation/Comparison—Mira Mesa to San Diego:

Kearny Mesa Station

The Kearny Mesa Station has no vacant land at the station site or vicinity. The site is currently occupied by several commercial office buildings, a fast-food restaurant, a small shopping center, and a complex of auto service shops. The alignments both north and south of the station site are proposed in tunnel. Given that, it is assumed that the station itself would be underground, and the only surface land use impacts would be those associated with station access and parking. Conflicts with Convoy Street, a major arterial street, and an existing electrical power transmission line along I-805 would be minimized if the station is underground, as anticipated.

Planned Land Use: There is no vacant land at the station site or nearby. However, the *Kearny Mesa Community Plan* shows that the area is designated for commercial and industrial uses.

Redevelopment Potential: The site and vicinity are fully developed and have not been identified as desirable for redevelopment by the City of San Diego.

Qualcomm Stadium in East Mission Valley

Most of the Qualcomm Stadium station site is shown within the existing stadium parking area. The station design should be coordinated with the existing San Diego Trolley station.

Planned Land Use: There is no vacant land at the station site or nearby, other than the stadium parking lot. However, the *Mission Valley Community Plan* shows that the area is designated for commercial recreation and public recreation.

Redevelopment Potential: The site and vicinity are developed and have not been identified as desirable for redevelopment by the City of San Diego. However, the large acreage of surface parking could be used for additional development if parking for the stadium were to be in structures.

Visual Quality Impacts

Alignment Evaluation/Comparison—Mira Mesa to San Diego:

Alignment 3.a From I-15 through Carroll Canyon/Miramar Road to San Diego via the LOSSAN Corridor

This alignment extends through Carroll Canyon and joins the coastal route at the University Towne Center (UTC). The alignment is predominantly open space with commercial and industrial development. There are no significant historic figures; however, the canyon does have sensitive landscape features, some residential areas and a major cemetery. The proposed construction could be either aerial or trench for this entire segment. Either construction type will involve cuts and fills within Carroll Canyon. Within the UTC, the alignment may involve impacting a constrained corridor with relatively high visual compatibility. This alignment is viewed as having a medium to low overall visual compatibility. For the rider, the visual appeal depends on the construction type, but the views will be generally blocked by the nature of the canyon and dense urban development around the UTC, resulting in a low to medium visual appeal.

Alignment 3.b I-15 Freeway to Miramar Road to San Diego via the LOSSAN Corridor

The alignment following Miramar Road impacts MCAS Miramar in that there is considerable new commercial and residential development on either side of the road. Through discussions with MCAS Miramar, it is clear that visual impacts, not to mention the physical right-of-way impacts, would result in a low community compatibility for this alignment. While some portions of Miramar Road provide visual access to open space and the MCAS, the majority of the alignment is constrained and not appealing, regardless of the construction type proposed as fully aerial.

Alignment 3.c I-15 Freeway to SR-52 to San Diego via the LOSSAN Corridor

The alignment following SR-52 defines the southern boundary of MCAS Miramar. This corridor is predominantly open space until it crosses I-805. MCAS Miramar requested to reduce any impact by electromagnetic interference (EMI). Therefore, the probable construction type would be trench through and adjacent to MCAS Miramar. The engineers suggest an aerial structure from I-805. This particular segment would follow the San Clemente Park/Canyon, adjacent to which is a large residential community. This aerial alignment would not be visually compatible to users of the San Clemente Park and the residential neighborhood. Therefore, this alignment receives a low to medium valuation visual compatibility with the community. Similarly, the user does not receive any opportunities to look at the adjacent open space along MCAS Miramar while riding in a depressed trench. The views along San Clemente Park are relatively short and, therefore, the appeal of this visual alternative is low.

Alignment 3.d From I-15 to SR-163 to San Diego

This option follows SR-163 as an aerial or depressed structure until Mission Valley where it is in a tunnel down to the San Diego Santa Fe Depot. The Santa Fe Depot is an historic landmark and also there are two parks along this corridor, one of which is Balboa Park. The area in which this alignment is aerial or depressed in trench is primarily commercial with some open space. Balboa Park would not be impacted because this alignment would require tunneling under the park. The compatibility of this alignment in construction type is medium to high. The visual appeal for the rider is medium to low.

Alignment 3.e I-15 Freeway to Qualcomm Stadium in East Mission Valley

The alignment from Mira Mesa to Qualcomm Stadium most likely be 50 percent depressed in trench while passing through MCAS Miramar and 50 percent in tunnel to

ensure the appropriate grade to Qualcomm Stadium. These construction types ensure the least visual impact to adjacent parks and other land uses. Therefore, the community compatibility is high. These construction types provide the least visual appeal for riders and, therefore, the valuation is low for riders.

Alignment 3.f From I-15 to SR-163 to I-8 to San Diego via the LOSSAN Corridor

This alignment veers west along Mission Valley north of I-8 to meet the LA, San Diego via Orange County Corridor at I-5. There are no historical or culturally sensitive areas along this alignment; however, it would most likely be depressed in trench through the MCAS Miramar and then a mixture of aerial and trench through the commercial areas along SR-163. These construction types are generally compatible with the adjacent land uses and, therefore, the community compatibility is high. In sections of open space, this alignment offers a mixture of low to high visual appeal in that several areas are depressed, offering no visibility. Other areas are predominantly commercial, but there are still some portions of the alignment that provide visual access to the San Clemente Canyon open space area. Therefore, the visual appeal is medium.

Station Evaluation/Comparison—Mira Mesa to San Diego:

Kearny Mesa across from Montgomery Field

This station is proposed to be located near the Montgomery Field airport and there are no historical features identified; therefore, a station would be highly compatible.

Qualcomm Stadium in East Mission Valley

This station is proposed to connect with an existing transit center in a large-scale commercial area with no historically significant features; therefore, a multimodal station would be highly compatible.

E. MINIMIZE IMPACTS TO NATURAL RESOURCES

Water Resources

Alignment Evaluation/Comparison—Mira Mesa to San Diego: All options for Segment 3 are considered to have high constraints relative to water resources. The proposed alignments would traverse or longitudinally encroach into numerous water resources. These resources include Carroll Canyon Creek, Rose Canyon Creek, San Clemente Canyon, Murphy Canyon and the San Diego River. Most of these water bodies are located in relatively undeveloped areas and have natural channel bed and banks and associated wetland habitats. Except for the San Diego River, which is channelized in the area where the proposed alignment traverses. The proposed alignments traverse biologically sensitive areas supporting vernal pool basins in some portions, which are habitats to sensitive species. Impacts from these alignments to these sensitive resources would be difficult to minimize through either avoidance or mitigation.

Station Evaluation/Comparison—Mira Mesa to San Diego:

Kearny Mesa

This proposed station is not located in proximity to any water body. Any potential impacts to water resources would be minimal. The level of constraint is identified as low, based on the fact that potential impacts could be avoided or mitigated through implementation of construction BMPs.

Qualcomm Station

The location of the proposed station may result in temporary impacts to the San Diego River, which is channelized. A low level of constraint is identified, as potential water

quality impacts would be temporary and these impacts could be easily mitigated through implementation of construction BMPs.

Floodplain Impacts

Alignment Evaluation/Comparison—Mira Mesa to San Diego:
Proposed options for Segment 3 occur in Zone A, associated with higher risk of impacting the floodplain. The proposed options traverse numerous water resources, which include Carroll Canyon Creek, Rose Canyon Creek, San Clemente Canyon, Murphy Canyon, and the San Diego River. Proposed options for Segment 3 merit higher levels of constraint due to potential impacts to the natural and beneficial floodplain values of these resources.

Station Evaluation/Comparison—Mira Mesa to San Diego:

Kearny Mesa
This proposed station is located in Zone X, in the floodplain of Murray Canyon. The level of constraint is identified as low as the beneficial floodplain values associated with this floodplain are considered low and floodplain encroachment is minimal.

Qualcomm Station
This proposed station is located in Zone X, in the floodplain of the San Diego River. The level of constraint is identified as low as the beneficial floodplain values associated with the San Diego River are considered low and floodplain encroachment is minimal.

Wetland Impacts

Alignment Evaluation/Comparison—Mira Mesa to San Diego: All options for Segment 3 have severe constraints relative to wetland resources and associated sensitive species. Most of the undeveloped open spaces on or adjacent to these alignments support vernal pools and/or coastal sage scrub habitats, or high-value riparian habitats (Broadleaf riparian). The vernal pools at MCAS Miramar alone support at least five federally listed species: San Diego button celery, California Orcutt grass, San Diego mesa mint, Riverside fairy shrimp, and San Diego fairy shrimp. In some portions, the alignments must either traverse vernal pool basin habitat with sensitive species or adjacent heavily urbanized areas.

Nearly all options for Segment 3 were given the highest impact rating. Impacts from these options would be difficult to minimize through either avoidance or mitigation.

Threatened and Endangered Species Impacts

Alignment Evaluation/Comparison—Mira Mesa to San Diego: All options for Segment 3 have several constraints relative to Threatened and Endangered species issues. Most of the undeveloped, open spaces on or adjacent to these alignments support vernal pools and/or coastal sage scrub habitats, or high value riparian habitats. The vernal pools at MCAS Miramar alone support at least five federally-listed species: San Diego button-celery, California Orcutt grass, San Diego mesa mint, Riverside fairy shrimp, and San Diego fairy shrimp. Coastal sage scrub supporting the state- and federally listed California gnatcatcher cover much of the remaining open space. In some portions the alignments must either traverse vernal pool basins and California gnatcatcher habitat or adjacent heavily urbanized areas.

Nearly all options for Segment 3 were given the highest impact rating. Impacts from these alignments would be difficult to minimize through either avoidance or mitigation.

F. MINIMIZE IMPACTS TO SOCIAL AND ECONOMIC RESOURCES

Environmental Justice Impacts (Demographics)

Alignment Evaluation/Comparison—Mira Mesa to San Diego: This segment would affect nearly a mile of affordable housing in Clairemont. Between I-805 and I-8, possible environmental justice issues may be associated with removal of housing occupied by minorities. Also, there would be an issue regarding removal of military housing owned and operated by the Department of Defense north of Genesee Avenue. Likewise, this segment might require removal of military housing owned and operated by the Department of Defense in the Murphy Canyon area of Tierrasanta.

Station Evaluation/Comparison—Mira Mesa to San Diego: The proposed station sites at Mira Mesa, Kearny Mesa, and Qualcomm Stadium would not affect any minority or low-income neighborhoods.

Farmland Impacts

Alignment Evaluation/Comparison—Mira Mesa to San Diego: The proposed alignments in the Mira Mesa to San Diego segment would not affect any existing farmland areas in active production.

Station Evaluation/Comparison—Mira Mesa to San Diego: The proposed Mira Mesa, Kearny Mesa and Qualcomm Stadium sites are in developed areas and would not affect any farmland.

G. MINIMIZE IMPACTS TO CULTURAL RESOURCES

Cultural Resources Impacts

Alignment Evaluation/Comparison—Mira Mesa to San Diego:
There are no historic properties in the areas of Miramar Road, Carroll Canyon, SR-52, SR-163/I-8, and I-15 to Qualcomm Stadium. SR-163 to the Santa Fe depot station would impact three historic properties in the Balboa Park area.

Parks and Recreation/Wildlife Refuge Impacts

Alignment Evaluation/Comparison—Mira Mesa to San Diego: Alignment, Carroll Canyon to University City Station, would have slight impacts because it may require some right-of-way from Hourglass Field Community Park. However, it would not affect any additional parklands. Similarly, the I-15/SR-52 would have slight impacts because it would run through small parts of the Marian Bear Memorial Natural Park. The Miramar Road Alignment may also have slight impacts because, once it joins SDNR, it would run along Rose Canyon Open Space and Marian Bear Natural Park. However, it is not expected to require additional right-of-way. The fourth option that would have slight impacts is the I-15/SR-163/I-8 Alignment, which would run adjacent to Presidio Community Park and near, but not adjacent to, Mission Heights Park.

The I-15/SR-163 Alignment would have significant impacts to parklands because a 2.5-mile metric tunnel would have to be built below Balboa Park, and special approvals would be required.

The I-15 to Qualcomm Stadium Alignment would not run through or adjacent to any parklands. No impacts are anticipated.

Station Evaluation/Comparison—Mira Mesa to San Diego: None of the proposed stations are within or adjacent to parklands. There will be no impacts.

H. MAXIMIZE AVOIDANCE OF AREAS WITH GEOLOGIC AND SOILS CONSTRAINTS

Soils/Slope Constraints

Alignment Evaluation/Comparison—Mira Mesa to San Diego: The soils in the six alignments in Segment 3 all consist of non-marine, marine and terrace deposits. The slope can be constructed with a 2:1 ratio, in general. There is a low potential of landslides in Segment 3 due to an absence of a rise in topography.

Seismic Constraints

Alignment Evaluation/Comparison—Mira Mesa to San Diego: There is a low to moderate potential for liquefaction in Segment 3 due to the type of soils that are present. The Rose Canyon Fault is the only apparent fault in Segment 3. This fault is near or comes in contact with Alignments 3.a, 3.b, 3.c, and 3.f.

I. MAXIMIZE AVOIDANCE OF AREAS WITH POTENTIAL HAZARDOUS MATERIALS

Hazardous Materials/Waste Constraints

Alignment Evaluation/Comparison—Mira Mesa to San Diego:
Alternative Alignment 3.a. No sites were identified.

Alternative Alignment 3.b. No sites were identified.

Alternative Alignment 3.c. No sites were identified.

Alternative Alignment 3.d. Only one generator and one release site were identified. There was no database information found to suggest that significant constraints exist within this option.

Alternative Alignment 3.e. Only one generator and one release site were identified. No database information suggested that significant constraints may exist within this option.

Alternative Alignment 3.f. Only one generator was identified. No database information suggested that significant constraints may exist within this option.

Station Evaluation/Comparison—Mira Mesa to San Diego: No hazardous waste sites were identified based on the GIS data review at any of the station location options.

Table 4.1-1
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 1—Los Angeles Union Station to March Air Reserve Base

Evaluation Criteria	Segment 1 Alignments—LA Union Station to March ARB						
	1.a via UP Colton	**1.b via UP Riverside**	**1.c via I-10**	**1.d via SR 60**	**1.e via BNSF/SR 91**	**1.f via UP Colton/ San Bernardino**	**1.g UIA UP Riverside/UP Colton**
Maximize Ridership/Revenue Potential							
Travel Time	28.5 minutes	46.0 minutes	43.4 minutes	37.4 minutes	52.2 minutes	36.4 minutes	31.0 minutes
	5	**2**	**3**	**4**	1	**4**	**5**
Length	66.8 miles (107 km)	67.9 miles (109 km)	63.8 miles (103 km)	62.9 miles (101 km)	70.2 miles (113 km)	73.6 miles (118 km)	67.5 miles (109 km)
	4	**3**	**5**	**5**	**2**	1	**4**
Population/ Employment Catchment	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Maximize Connectivity and Accessibility							
Intermodal Connection	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Minimize Operating and Capital Costs							
Length	66.8 miles (107 km)	67.9 miles (109 km)	63.8 miles (103 km)	62.9 miles (101 km)	70.2 miles (113 km)	73.6 miles (118 km)	67.5 miles (109 km)
	4	**3**	**5**	**5**	**2**	1	**4**
Operational Issues	Speed restrictions at curves and urban environment, average speed 142 mph (228 kph)	Speed restrictions at curves and urban environment, average speed 130 mph (209 kph).	Speed restrictions at curves and urban environment, average speed 92 mph (148 kph).	Speed restrictions at curves and urban environment, average speed 107 mph (172 kph).	Speed restrictions at curves and urban environment, average speed 86 mph (138 kph).	Speed restrictions at curves and urban environment, average speed 129 mph (208 kph).	Speed restrictions at curves and urban environment, average speed 131 mph (211 kph)
	5	**4**	**2**	**3**	1	**4**	**5**

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Construction Issues	Construction in an urban environment, relocating and maintaining existing railroad operations	Construction in an urban environment, relocating and maintaining existing railroad operations	Construction in an urban environment, relocating and maintaining freeway access and capacity	Construction in an urban environment, relocating and maintaining freeway access and capacity	Construction in an urban environment, relocating and maintaining existing railroad operations	Construction in an urban environment, relocating and maintaining existing railroad operations	Construction in an urban environment, relocating and maintaining existing railroad operations
	3	**3**	1	1	**2**	**3**	**3**
Capital Cost							
	5	**4**	**3**	**3**	**4**	**5**	**5**
Right-of-Way Issues/Cost	Uses existing railroad ROW that have limited widths, may require relocation of existing railroad operations.	Uses existing railroad ROW that have limited widths, may require relocation of existing railroad operations.	Freeway ROW is very constrained with very little available width. ROW acquisition is likely to be a major issue.	Freeway ROW is very constrained with very little available width. ROW acquisition is likely to be a major issue.	Freeway ROW is very constrained with very little available width. ROW acquisition is likely to be a major issue. Uses existing railroad ROW that have limited widths, may require relocation of existing railroad operations.	Uses existing railroad ROW that have limited widths, may require relocation of existing railroad operations.	Uses existing railroad ROW that have limited widths, may require relocation of existing railroad operations.
	4	**4**	**3**	**3**	**3**	**2**	**4**
Maximize Compatibility with Existing and Planned Development							
Land Use Compatibility and Conflicts	Local Parks: 11 Schools: 16 Regional Parks: Box Springs Mtn. Regional Hospital: 2 Major Public Facilities: LA County Jail & El Monte Courts	Local Parks: 10 Schools: 9 Regional Parks: Santa Ana River Wildlife Area Regional Hospital: 1 Major Public Facilities: LA County Jail & Lanterman Center	Local Parks: 10 Schools: 19 Regional Parks: Bonelli Regional Regional Hospital: 4 Major Public Facilities: West Covina Courthouse	Local Parks: 15 Schools: 20 Regional Parks: None Regional Hospital: None Major Public Facilities: LA County Jail Military Uses: None	Local Parks: 17 Schools: 13 Regional Parks: Chino Hills State; Featherly Regional Regional Hospital: 2 Major Public Facilities: LA County Jail & Cal. Youth Authority	Local Parks: 14 Schools: 21 Regional Parks: Box Springs Mtn. Regional Hospital: 2 Major Public Facilities: LA County Jail & El Monte Courthouse	Local Parks: 11 Schools: 16 Regional Parks: Box Springs Mtn. Regional Hospital: 2 Major Public Facilities: LA County Jail & El Monte Courts

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	Military Uses: None Historical Sties: San Gabriel Mission University: UC – Riverside Regional Shopping: Mariachi Plaza Cemetery: None	Military Uses: None Historical Sites: None University: UC-Riverside Regional Shopping: None Cemetery: None	Military Uses: None Historical Sties: None University: CSU Pomona & LA Regional Shopping: Montclair/W Covina Cemetery: Forest Lawn	Historical Sites: Jurupa Cultural Ctr. University: None Regional Shopping: Puente Hills Cemetery: Calvary Cemetery	Military Uses: None Historical Sites: None University: Cal Baptist: UCA Regional Shopping: None Cemetery: Olivewood Cemetery	Military Uses: None Historical Sites: San Gabriel Mission University: UC – Riverside Regional Shopping: Mariachi Plaza Cemetery: None	Military Uses: None Historical Sties: San Gabriel Mission University: UC – Riverside Regional Shopping: Mariachi Plaza Cemetery: None
	3	**4**	**4**	**3**	**2**	**3**	**4**
Visual Quality Impacts	Factors: 60% Aerial or Trench 30 % At-grade 3 historic and cultural sensitivity (special features) 5 parks/ landscape features Predominantly Industrial/ Commercial Visual Assessment for community compatibility = medium Visual Assessment by Rider = low visual appeal	Factors: 30% Aerial or Trench 70 % At-grade 2 Historic and Cultural features 12 parks/ landscape features Predominantly Industrial Visual Assessment for Community compatibility = medium Visual Assessment by Rider = medium visual appeal	Factors: 100% Aerial 0 Historic and Cultural features 9 parks/ landscape features Predominantly Industrial/ Commercial Visual Assessment for Community compatibility = medium/high Visual Assessment by Ride r= low appeal	Factors: 100% Aerial 1 Historic and Cultural features 16 parks/ landscape features Predominantly commercial Visual Assessment for Community compatibility = medium Visual Assessment by Rider = medium/ high appeal	Factors: 40% Aerial or Trench 60 % Aerial 0 Historic and Cultural features 17 parks/ landscape features Predominantly Industrial/ Commercial/ residential Visual Assessment for Community compatibility = medium/low Visual Assessment by Rider = medium/ low appeal	Factors: 65% Aerial or Trench 25 % At-grade 4 historic and cultural sensitivity (special features) 8 parks/ landscape features Predominantly Industrial with residential Visual Assessment for Community compatibility = medium/low Visual Assessment by Rider = medium/ low appeal	Factors: 60% Aerial or Trench 30 % At-grade 3 historic and cultural sensitivity (special features) 5 parks/ landscape features Predominantly Industrial/ Commercial Visual Assessment for community compatibility = medium Visual Assessment by Rider = low visual appeal

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	2	**3**	**3**	**3**	**2**	**2**	**2**
Minimize Impacts to Natural Resources							
Water Resources	- LA River - San Pasqual Wash - Alhambra Wash - Rubio Wash - Rio Hondo - San Gabriel River - Puente Creek - San Jose Creek - San Antonio Channel - Mill Creek - Cucamonga Creek Flood Control Channel - Day Creek Channel - Etiwanda Creek Channel - Etiwanda San Sevaine Flood Control Channel - Mulberry Creek - Rialto Channel - Santa Ana River - Riverside Canal Aqueduct - Gage Canal	- LA River - Rio Hondo - San Gabriel River - San Jose Creek - San Antonio Channel - Mill Creek - Riverside Basin - Cucamonga Creek Flood Control Channel - Etiwanda San Sevaine Flood Control Channel - Santa Ana River - Riverside Canal Aqueduct - Gage Canal	- LA River - Alhambra Wash - Rubio Wash - Rio Hondo - San Gabriel River - Walnut Creek - San Jose Creek - San Antonio Channel - Mill Creek - Cucamonga Creek Flood Control Channel - Day Creek Channel - Etiwanda Creek Channel - Etiwanda San Sevaine Flood Control Channel - Mulberry Creek	- LA River - Rio Hondo - San Gabriel River - San Antonio Channel - Mill Creek - Etiwanda San Sevaine Flood Control Channel - Santa Ana River - Riverside Canal Aqueduct - Gage Canal	- LA River - Rio Hondo - San Gabriel River - North Fork Coyote Creek - Santa Ana River - Temescal Creek - Riverside Canal Aqueduct	- Etiwanda Creek Channel - Etiwanda San Sevaine Flood Control Channel - Rialto Channel - Lytle Cajon Channel - Santa Ana River	- LA River - San Pasqual Wash - Alhambra Wash - Rubio Wash - Rio Hondo - San Gabriel River - Puente Creek - San Jose Creek - San Antonio Channel - Mill Creek - Cucamonga Creek Flood Control Channel - Day Creek Channel - Etiwanda Creek Channel - Etiwanda San Sevaine Flood Control Channel - Mulberry Creek - Rialto Channel - Santa Ana River - Riverside Canal Aqueduct - Gage Canal

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	5	**5**	**4**	**3**	**3**	**5**	**5**
Floodplain Impacts	LA River Rio Hondo San Gabriel River Santa Ana River	LA River Rio Hondo San Gabriel River Santa Ana River	LA River Rio Hondo San Gabriel River	LA River Whittier Narrows (Rio Hondo, San Gabriel River) Santa Ana River	LA River Rio Hondo San Gabriel River Santa Ana River	Santa Ana River	LA River Rio Hondo San Gabriel River Santa Ana River
	4	**4**	**4**	**3**	**3**	**4**	**4**
Wetlands	PE at San Gabriel River PE, RI, at Santa Ana River Moderate level of constraint	PE at San Gabriel River PE,RI at Santa Ana River Moderate level of constraint	PE San Gabriel River PE at Walnut Creek PE, RI at Diamond Bar Creek, 57 & and 60 Interchange PE at Mulberry Creek Moderate level of constraint	PE at San Gabriel River PE, RI at Santa Ana River RI at Box Springs Road VP in Western Riverside County (associated with Agricultural lands) High level of constraint	PE at San Gabriel River (PE) PE at North Fork Coyote Creek PE, RI at Santa Ana River (high quality riparian habitat near Prado Basin) PE, RI at Temescal Creek High level of constraint	PE, RI at Santa Ana River Low level of constraint	PE at San Gabriel River PE, RI, at Santa Ana River Moderate level of constraint
	4	**4**	**4**	**2**	**2**	**5**	**4**
Threatened & Endangered Species Impacts	- Predominately developed route, low potential for impacts; - Close to burrowing owl habitat (not a listed species) Constraint Level =	- Predominately developed route, low potential for impacts Constraint Level = Low	- Predominantly developed route, low potential for impacts - Close proximity to California Gnatcatcher habitat Constraint Level = Low/Moderate	- Close proximity to Broadleaf Riparian and associated special status species - Crossings at San Gabriel River, Santa Ana River, Box Springs Road area with potential T&E	- Most of route developed - Close proximity to Least Bell's vireo and Stephens' Kangaroo Rat - Crossings at San Gabriel River, North	- Urbanized route, low potential for impacts Constraint Level = Low	- Predominately developed route, low potential for impacts; - Close to burrowing owl habitat (not a listed species) Constraint Level = Low

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	Low			riparian and aquatic species Vernal pool in Western Riverside County associated with Agricultural lands with potential for Riverside and Vernal Pool Fairy Shrimp Constraint Level = Moderate/High	Fork Coyote Creek, and Santa Ana River (high quality riparian habitat near Prado Basin) PE, RI at Temescal Creek Constraint Level = Moderate		
	4	**5**	**4**	**3**	**3**	**5**	**4**
Minimize Impacts to Social and Economic Resources							
Environmental Justice Impacts (Demographics)	Low-Mod Area: Medium High Minority: High Both Low-Mod/ Minority: Medium	Low-Mod Area: Medium High Minority: High Both Low-Mod/Minority: Medium	Low-Mod Area: Medium High Minority: High Both Low-Mod/Minority: Medium	Low-Mod Area: Low High Minority: High Both Low-Mod/Minority: Low	Low-Mod Area: Medium High Minority: Medium Both Low-Mod/Minority: Medium	Low-Mod Area: Medium High Minority: High Both Low-Mod/Minority: Medium	Low-Mod Area: Medium High Minority: High Both Low-Mod/Minority: Medium
	3	**3**	**3**	**4**	**4**	**3**	**3**
Farmland Impacts	None	None	None	None	None	None	None
	5	**5**	**5**	**5**	**5**	**5**	**5**
Minimize Impacts to Cultural Resources							
Cultural Resources Impacts	Ref# 72000231 Los Angeles Plaza Historic District Ref# 80000811 Los Angeles Union	Ref# 72000231 Los Angeles Plaza Historic District Ref# 80000811 Los Angeles Union	Ref# 72000231 Los Angeles Plaza Historic District Ref# 80000811 Los Angeles Union	none	Ref# 72000231 Los Angeles Plaza Historic District Ref# 80000811 Los Angeles Union	Ref# 72000231 Los Angeles Plaza Historic District Ref# 80000811 Los Angeles Union	Ref# 72000231 Los Angeles Plaza Historic District Ref# 80000811 Los Angeles Union

Table 4.1-1
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 1—Los Angeles Union Station to March Air Reserve Base

Evaluation Criteria	Segment 1 Alignments—LA Union Station to March ARB						
	1.a via UP Colton	**1.b via UP Riverside**	**1.c via I-10**	**1.d via SR 60**	**1.e via BNSF/SR 91**	**1.f via UP Colton/ San Bernardino**	**1.g UIA UP Riverside/UP Colton**
	passenger Terminal Ref# 78000689 Plaza Substation Ref# 71000158 San Gabriel Mission Ref# 86000408 Pomona YMCA Building	passenger Terminal Ref# 78000689 Plaza Substation Ref# 82002201 Pomona Fox Theater Ref# 86001477 Edison Historic District Ref# 82002227 Old YMCA Building Ref# 80000833 Riverside-Arlington Heights Fruit Exchange	passenger Terminal Ref# 78000689 Plaza Substation		passenger Terminal Ref# 78000689 Plaza Substation Ref# 78000684 McNally's Windemere Ranch Headquarters Ref# 94000360 Farmers and Merchants Bank of Fullerton Ref# 83003551 Fullerton Union Pacific Depot	passenger Terminal	passenger Terminal Ref# 78000689 Plaza Substation Ref# 71000158 San Gabriel Mission Ref# 86000408 Pomona YMCA Building
	2	**2**	**4**	**5**	**2**	**2**	**2**

Table 4.1-1
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 1—Los Angeles Union Station to March Air Reserve Base

Evaluation Criteria	Segment 1 Alignments—LA Union Station to March ARB						
	1.a via UP Colton	**1.b via UP Riverside**	**1.c via I-10**	**1.d via SR 60**	**1.e via BNSF/SR 91**	**1.f via UP Colton/ San Bernardino**	**1.g UIA UP Riverside/UP Colton**
Parks and Recreation/ Wildlife Refuge Impacts	**PARKS**						
	3 Parks Lincoln Park, Lincoln Heights Almansor Park, Alhambra Highland Park, Riverside	Amigo Park, Pico Rivera Rose Hills Memorial Park Little League Field and Park, Diamond Bar Martha McLean Anza Narrows Park, Jurupa Nichols Park, Jurupa	El Pueblo de Los Angeles State Historic Park , Los Angeles Ramona Gardens Park, Boyle Heights Parque Xalapa, West Covina Frank G. Bonelli Regional Park, San Dimas Ganesha Park, Pomona Wilderness Park, Montclair MacArthur Park, Montclair	Belvedere Park, East Los Angeles Bella Vista Park, Monterey Park Carlton Petersen Park, Diamond Bar Fairmount Park, Riverside	Zimmerman Park, Norwalk Independence Park of Fullerton Amerige Park, Fullerton Peralta Canyon Park, Anaheim Yorba Regional Park, Anaheim Featherly Regional Park, Yorba Linda Griffin Park, Corona A D Shamel Park, Riverside	Santa Fe Park, Fontana Nunez Park, San Bernardino	Lincoln Park, Lincoln Heights Almansor Park, Alhambra Highland Park, Riverside
	RECREATION AREAS						
	Alhambra Municipal Golf Course	None	None	Ramon Garcia Recreation Center, Boyle Heights Whittier Narrows Recreation Area, South El Monte Diamond Bar Golf Course, Diamond Bar	None	None	Alhambra Municipal Golf Course
	WILDLIFE REFUGES						

Table 4.1-1
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 1—Los Angeles Union Station to March Air Reserve Base

Evaluation Criteria	Segment 1 Alignments—LA Union Station to March ARB						
	1.a via UP Colton	**1.b via UP Riverside**	**1.c via I-10**	**1.d via SR 60**	**1.e via BNSF/SR 91**	**1.f via UP Colton/ San Bernardino**	**1.g UIA UP Riverside/UP Colton**
	Box Springs Mountain Reserve, Riverside	Santa Ana River Wildlife Area, Jurupa	None	Quail Run Open Space, Riverside	None	None	Box Springs Mountain Reserve, Riverside
	3	**2**	**2**	**2**	**2**	**4**	**3**
Soils/Slope Constraints	Soils consist of alluvium and older lake deposits Slope can be constructed with a 2:1 ratio, in general Overall, low potential for landslide Potential for landslides moderate to high where the UP Colton comes in contact with the Puente Hills and San Jose Hills	Soils consist of younger fan deposits, wind-blown sand, older fan deposits and mostly alluvium, lake, playa and terrace deposits Slope can be constructed with a 2:1 ratio, in general Overall, low potential for landslide Potential for landslides is moderate to high where the UP Riverside comes in contact with the Puente Hills	Soils consist of non-marine, marine, wind-blown sand, glacial deposits, a very small amount of volcanics and primarily alluvium Slope can be constructed with a 2:1 ratio, in general Overall, low potential for landslide Potential for landslides is moderate to high where the I-10 comes in contact with the San Jose Hills	Soils consist of Alluvium deposits (mostly non-marine) and rock consists of moderate to well-consolidated sandstone, shale, siltstone, conglomerates and breccia Slope can be constructed with a 2:1 ratio, in general Overall, low potential for landslide Potential for landslides is moderate to high where SR 60 comes in contact with the Puente Hills	Soils consist of older lake deposits, primarily alluvium and approx. 1 mile of granite at the end of alignment Slope can be constructed with a 2:1 ratio, in general Overall, low potential for landslide Potential for landslides is moderate to high where the 91 freeway meets the Peralta Hills and the Santiago Mountains	Soils consist primarily of alluvium Slope can be constructed with a 2:1 ratio, in general Potential for landslides is low	Soils consist of alluvium and older lake deposits Slope can be constructed with a 2:1 ratio, in general Overall, low potential for landslide Potential for landslides moderate to high where the UP Colton comes in contact with the Puente Hills and San Jose Hills
	2	**2**	**2**	**2**	**2**	**4**	**2**
Seismic Constraints	Moderate to high potential for liquefaction Two major faults cross this segment: Santa Monica Fault Zone in East LA	Moderate to high potential for liquefaction Several major faults nearby may have impact on this alignment:	Moderate to high potential for liquefaction Two major faults pass through this alignment: San Jacinto Fault	Moderate to high potential for liquefaction One major fault passes through the alignment at the San Antonio Creek	Moderate to high potential for liquefaction Three major faults pass through the alignment: San Jacinto Fault at	Moderate to high potential for liquefaction One major fault passes through the alignment at intersection of 15	Moderate to high potential for liquefaction Two major faults cross this segment: Santa Monica Fault Zone in East LA (Type B, MG MAX = 6.6)

Table 4.1-1
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 1—Los Angeles Union Station to March Air Reserve Base

Evaluation Criteria	Segment 1 Alignments—LA Union Station to March ARB						
	1.a via UP Colton	**1.b via UP Riverside**	**1.c via I-10**	**1.d via SR 60**	**1.e via BNSF/SR 91**	**1.f via UP Colton/ San Bernardino**	**1.g UIA UP Riverside/UP Colton**
	(Type B, MG MAX = 6.6) San Jacinto Fault 3 miles east of alignment in southern San Bernardino (Type B, MG MAX = 6.7) Moderate to high potential for surface rapture at the fault location. Several other faults nearby may have impacts on the alignment. Detail investigation recommended for the potential impact of the fault on the alignment.	Santa Monica Fault Zone (Type B, MG MAX = 6.6) San Jose Fault (Type B, MG MAX = 6.5) Chino Fault (Type B, MG MAX = 6.7) Detail investigation recommended for the potential impacts of the faults on the alignment.	approx. 1 ½ to 2 miles (2.4 to 3.2 km) west of the 15 freeway (Type B, MG MAX = 6.7) San Jose Fault at the intersection of I-10 and 71 (Type B, MG MAX = 6.5) Moderate to high potential for surface rapture at the fault location. Several other faults nearby may have impact on the alignment. Detail investigation recommended for the potential impact of the fault on the alignment.	Channel: Chino Fault (Type B, MG MAX = 6.7) Moderate to high potential for surface rapture at the fault location Several other faults nearby may have impact on the alignment Detail investigation recommended for the potential impact of the fault on the alignment	the intersection of I-15 freeway and SR-60 in South San Bernardino (Type B, MG MAX = 6.7) Chino Fault ½ mile/east of intersection 71 and SR-91 (Type B, MG MAX = 6.7) Whittier-Elsinore Fault 3 miles west of intersection of 71 and 91 (Type B, MG MAX = 6.8) Moderate to high potential for surface rapture at the fault location Several other faults nearby may have impact on the alignment Detail investigation recommended for the potential impact of the fault on the alignment	freeway and SR 60: San Jacinto Fault (Type B, MG MAX =6.7) Moderate to high potential for surface rapture at the fault location Several other faults nearby may have impact on the alignment Detail investigation recommended for the potential impact of the fault on the alignment	San Jacinto Fault 3 miles east of alignment in southern San Bernardino (Type B, MG MAX = 6.7) Moderate to high potential for surface rapture at the fault location Several other faults nearby may have impacts on the alignment Detail investigation recommended for the potential impact of the fault on the alignment
	2	**2**	**2**	**3**	1	**3**	**2**

Table 4.1-1
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 1—Los Angeles Union Station to March Air Reserve Base

Evaluation Criteria	Segment 1 Alignments—LA Union Station to March ARB						
	1.a via UP Colton	**1.b via UP Riverside**	**1.c via I-10**	**1.d via SR 60**	**1.e via BNSF/SR 91**	**1.f via UP Colton/ San Bernardino**	**1.g UIA UP Riverside/UP Colton**
Hazardous Materials/ Waste Constraints	12 hazardous waste generators 1 hazardous waste transporter 3 hazardous waste release sites (1 site no further action)	5 hazardous waste generators 5 hazardous waste release sites (1 site no further action; 1 site may be significant (DTSC Code AA+)	1 hazardous waste generator 1 hazardous waste site (no further action)	1 hazardous waste generator 2 hazardous waste release sites (1 site no further action)	7 hazardous waste generators 7 hazardous waste release sites (2 sites no further action)	2 hazardous waste generators 2 hazardous waste transporters 2 hazardous waste sites	12 hazardous waste generators 1 hazardous waste transporter 3 hazardous waste release sites (1 site no further action)
	4	**3**	**5**	**4**	**3**	**3**	**4**

Table 4.1-2
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 2—March ARB to Mira Mesa

Evaluation Criteria	Segment 2 Alignments— March ARB to Mira Mesa	
	2.a **Maximize Tunnels**	**2.b** **Minimize Tunnels**
Travel Time	20.4 minutes	20.8 minutes
	5	**5**
Length	70.3 miles (113 km)	71.8 miles (115 km)
	5	**4**
Population / Employment Catchment	Not Applicable	Not Applicable
Maximize Connectivity and Accessibility		
Intermodal Connection	The Escondido West station site is accessible by road from I-15 and SR-78 via Mission Road; it also has access to a rail spur south of Mission; the Mira Mesa station has auto access to I-15 via Mira Mesa Blvd. and Scripps Ranch Blvd. The Escondido West station site could connect with automobiles and buses, and trains via an adjacent rail spur; however little intermodal connection is considered likely at the present proposed Mira Mesa site.	The Escondido East station site is accessible by road from I-15 and SR-78 via Centre City Parkway and Valley Parkway; it also is near a rail spur; the Mira Mesa station has auto access to I-15 via Mira Mesa Blvd. and Scripps Ranch Blvd.. The Escondido East station site could connect with cars and buses, and trains via a nearby rail spur; it is adjacent to Escondido Transit Center; however little intermodal connection is considered likely at the presently proposed Mira Mesa site.
Minimize Operating and Capital Costs		
Length	70.3 miles (113 km)	71.8 miles (115 km)
	5	**5**
Operational Issues	Flatter grades and fewer curves, average speed 207 mph (333 kph)	Slightly steeper grades and tighter curves, average speed 207 mph (333 kph).
	5	**5**
Construction Issues	Considerable tunnel construction; inaccessible terrain	Fewer tunnels, but more earthwork

Table 4.1-2
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 2—March ARB to Mira Mesa

Evaluation Criteria	Segment 2 Alignments— March ARB to Mira Mesa	
	2.a **Maximize Tunnels**	**2.b** **Minimize Tunnels**
	2	**4**
Capital Cost		
	2	**4**
Right-of-Way Issues/Cost	New right-of-way required through sensitive environment.	Substantial earthwork may require additional right-of-way or extensive retaining walls
	4	**2**
Maximize Compatibility with Existing and Planned Development		
Land Use Compatibility and Conflicts	Crosses 6.15 miles (9.9 km) of existing residential areas; likely more than 250 individual homes would need to be removed. Crosses 0.4 mile (0.6 km) of San Dieguito River Park (JPA) at Lake Hodges; crosses the main Post Office for the San Diego area for 0.25 mile (0.4 km); perhaps that part of the route could be moved to the east. Would act to divide the community of Carmel Mountain Ranch, and would adversely affect the entry into the community (per City of San Diego Planning Department).	Crosses 2.55 miles (4.1 km) of existing residential areas; likely more than 100 individual homes would have to be removed. Crosses 0.55 mile (0.88 km) of Kit Carson Park in Escondido; 0.5 mile (0.8 km) of San Dieguito River Park; and is adjacent to Rod McLeod Park in Escondido. Would cross North County Fair Shopping Center, passing over or through retail structures if this alignment stays in the same place; perhaps it could be moved to the east, to pass over the parking lot. Crosses the main Post Office for the San Diego area for 0.25 mile (0.4 km); perhaps that part of the route could be moved to the east. Would act to divide the community of Carmel Mountain Ranch, and would adversely affect the entry into the community (per City of San Diego Planning Department)
	3	**2**
Visual Quality Impacts	<u>Factors:</u> 40% Aerial or tunnel 40 % At-grade 10% Aerial 0 historic and cultural sensitivity 9 parks/landscape features Predominantly Open space/agriculture and areas with residential Visual Assessment for Community compatibility =	<u>Factors</u>: 40% Most tunnel, some aerial 40 % At-grade 10% Aerial 0 historic and cultural sensitivity 9 parks/landscape features Predominantly Open space/agriculture and areas with residential Visual Assessment for Community compatibility = medium/low Visual assessment for Rider = medium/ high appeal

Table 4.1-2
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 2—March ARB to Mira Mesa

Evaluation Criteria	**Segment 2 Alignments— March ARB to Mira Mesa**	
	2.a **Maximize Tunnels**	**2.b** **Minimize Tunnels**
	medium/high Visual assessment for Rider = low appeal	
	3	**3**
Minimize Impacts to Natural Resources		
Water Resources	Perris Valley Storm Drain Val Verde Tunnel Colorado Aqueduct San Jacinto River Menifee Lakes Country Club lakes Warm Springs Creek Santa Gertrudis Creek Murrieta Creek Santa Margarita River Rainbow Creek Second San Diego Aqueduct San Luis Rey River Second San Diego Aqueduct unnamed creek near Pala Mesa Resort San Luis Rey River Keys Creek unnamed creeks at Nelson Road and Old Hwy 395 (Moose Canyon; SDTBG 1068/1069) unnamed creeks at Old Castle Road (SDTBG 1068/1069) unnamed creek adjacent to Champagne Blvd (SDTBG 1089) unnamed creek at S12 interchange (SDTBG 1089) Siphon Vista Canal/San Marcos Escondido Creek	Perris Valley Storm Drain Val Verde Tunnel Colorado Aqueduct San Jacinto River Menifee Lakes Country Club lakes Warm Springs Creek Santa Gertrudis Creek Long Canyon Empire Creek Temecula Creek Second San Diego Aqueduct (3 crossings) unnamed creek at Stewart Crest Road (SDTBG 1028) unnamed creek at Pala Road (SDTBG 1048) San Luis Rey River Keys Creek unnamed creeks at Nelson Road and Old Hwy 395 (Moose Canyon; SDTBG 1068/1069) unnamed creeks at Old Castle Road (Reidy Canyon; SDTBG 1068/1069) unnamed creek adjacent to Champagne Blvd (SDTBG 1089) unnamed creek at S12 interchange (SDTBG 1089) Siphon Vista Canal/San Marcos Reidy Canyon Escondido Creek unnamed creek at Via Rancho Pkwy

Table 4.1-2
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 2—March ARB to Mira Mesa

Evaluation Criteria	**Segment 2 Alignments— March ARB to Mira Mesa**	
	2.a **Maximize Tunnels**	**2.b** **Minimize Tunnels**
	Lake Hodges/San Dieguito River unnamed creek at Rancho Bernardo Golf Course unnamed creek at Rancho Bernardo Golf Course Chicarita Creek Penasquitos Creek Second San Diego Aqueduct	Lake Hodges/San Dieguito River unnamed creek at Rancho Bernardo Golf Course Chicarita Creek Los Penasquitos Canyon Creek Second San Diego Aqueduct
	5	**3**
Floodplain Impacts	San Jacinto River Murrieta Creek Santa Margarita River San Luis Rey River Keys Creek San Dieguito River Penasquitos Creek	San Jacinto River Murrieta Creek Santa Margarita River San Luis Rey River Keys Creek San Dieguito River Penasquitos Creek
	3	**3**
Wetlands	RI, VP at San Jacinto River and I-215 in Perris RI, VP at Warm Springs Creek RI, VP at Murrieta Creek RI at Los Alamos off I - 215 RI, VP off I-15 at Santa Margarita River (Temecula Canyon Creek) RI, VP at Rainbow Creek RI, VP at San Luis Rey River RI at Gopher Canyon Road MA, VP at Lake Hodges/San Dieguito River (high quality wetlands) Moderate to High. Low if wetland impacts can be	RI, VP at San Jacinto River and I-215 in Perris RI, VP at Warm Springs Creek RI, VP at Murrieta Creek RI, VP at Los Alamos off I-215 RI, VP off I-15 at Santa Margarita River (Temecula Canyon Creek) RI, VP at Rainbow Creek RI, VP at San Luis Rey River RI at Gopher Canyon Road MA, VP at Lake Hodges/San Dieguito River (high quality wetlands) Moderate to High. Low if wetland impacts can be avoided by bridges spanning the wetlands

Table 4.1-2
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 2—March ARB to Mira Mesa

Evaluation Criteria	Segment 2 Alignments— March ARB to Mira Mesa	
	2.a **Maximize Tunnels**	**2.b** **Minimize Tunnels**
	avoided by siting tunnels away from wetlands	
	4	**2**
Threatened and Endangered Species Impacts	Agricultural land with possible vernal pools and associated T&E species Murrieta and San Luis Rey River floodplains with potential sensitive species impacts largely avoided by tunnels. Potential impacts to wildlife movement, particularly in the Coal Canyon area on the border of Riverside and Orange Counties. Impacts to habitat and movement would be mostly avoided on route with tunneling. -Potential impacts to Stephen's Kangaroo Rat. Constraint Level = Low/Moderate	Agricultural land with possible vernal pools and associated T&E species Murrieta and San Luis Rey River floodplains with potential sensitive species impacts. Potential impacts to movement, particularly in the Coal Canyon area on the border of Riverside and Orange Counties. Impacts to habitat and movement could be largely avoided with large underpasses and noise abatement measures. Potential impacts to Stephen's Kangaroo Rat. Constraint Level = Moderate
	4	**3**
Minimize Impacts to Social and Economic Resources		
Environmental Justice Impacts (Demographics)	No concentration of minority groups or low-income households was noted along this routing in the initial reconnaissance	It is possible that this routing would affect minority groups or low-income households in Escondido.
	5	**4**
Farmland Impacts	Only 0.3 mile (0.5 km) of agricultural land east of the East Mission Road interchange was noted from the aerial photography utilized for land use interpretation	Only 0.5 mile (0.8 km) of agricultural land east of the East Mission Road interchange was noted from the aerial photography for land use interpretation.
	3	**3**
Minimize Impacts to Cultural Resources		
Cultural Resources Impacts	None	None
	5	**5**

Table 4.1-2
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 2—March ARB to Mira Mesa

Evaluation Criteria	**Segment 2 Alignments— March ARB to Mira Mesa**	
	2.a **Maximize Tunnels**	**2.b** **Minimize Tunnels**
Parks and Recreation/ Wildlife Refuge Impacts	**PARKS**	
	Copper Creek Park, Perris Alta Murrieta Sports Park, Murrieta Felicita County Park, Escondido Sabre Springs Park, Sabre Springs	Copper Creek Park, Perris Rancho Acacias Park, Murrieta Jesmond Dene Park, Jesmond Dene Rod McLeod Park, Escondido Kit Carson Park, Escondido Sabre Springs Park, Sabre Springs
	RECREATION AREAS	
	None	None
	WILDLIFE REFUGES	
	None	Santa Margarita Ecological Reserve
	3	1
Maximize Avoidance of Areas with Geologic and Soils Constraints		
Soils/Slope Constraints	March ARB to just north of Paoma Valley – soils consist primarily of alluvium March ARB to just north of Paoma Valley – slope ratio of 2:1 can be constructed, in general March ARB to just north of Paoma Valley – low landslide potential (east of alignment), moderate landslide potential (west of alignment) Temecula to Mira Mesa – soils and bedrock consist of some deposits of marine sediments and older lake deposits, but primarily metavolcanic and granitic rock Temecula to Mira Mesa – Slope can be constructed with a 2:1 ratio, in general. Steeper slope may be feasible Temecula to Mira Mesa – moderate potential for landslides	March ARB to just north of Paoma Valley – soils consist primarily of alluvium March ARB to just north of Paoma Valley – slope ratio of 2:1 can be constructed, in general March ARB to just north of Paoma Valley – low landslide potential (east of alignment), moderate landslide potential (west of alignment) Temecula to Mira Mesa – soils and bedrock consist of older lake deposits, marine and non-marine deposits, metavolcanic rock (through South Fork Moosa Cyn.), and primarily granitic rock Temecula to Mira Mesa – Slope can be constructed with a 2:1 ratio, in general. Steeper slope may be feasible Temecula to Mira Mesa – moderate potential for landslides

Table 4.1-2
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 2—March ARB to Mira Mesa

Evaluation Criteria	**Segment 2 Alignments— March ARB to Mira Mesa**	
	2.a Maximize Tunnels	**2.b Minimize Tunnels**
	3	**3**
Seismic Constraints	From March ARB to just north of Paoma Valley – moderate potential for liquefaction Temecula to Mira Mesa – low potential for liquefaction due to granitic bedrock One major fault crosses this segment between Paoma Valley (to the north) and Temecula (to the south): Elsinore Fault (Type B, MG MAX = 6.8) Moderate to high potential for surface rapture at the fault location Detail investigation recommended for the potential impact of the fault on the alignment * With the exception of the San Luis Rey River and surrounding floodplain, granite in this alignment is potentially suitable for tunneling depending on the physical qualities of the bedrock	From March ARB to just north of Paoma Valley – moderate potential for liquefaction Temecula to Mira Mesa – low potential for liquefaction due to granitic bedrock One major fault crosses this segment between Paoma Valley (to the north) and Temecula (to the south): Elsinore Fault (Type B, MG MAX =6.8) Moderate to high potential for surface rapture at the fault location Detail investigation recommended for the potential impact of the fault on the alignment
	3	**3**
Maximize Avoidance of Areas with Potential Hazardous Materials		
Hazardous Materials/ Waste Constraints	1 hazardous waste release site	3 hazardous waste release sites (2 sites no further action)
	5	**5**

Table 4.1-3
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 3—Mira Mesa to San Diego Qualcomm Stadium

Evaluation Criteria	Segment 3 Alignments--Mira Mesa to San Diego					
	3.a via Carroll Canyon	**3.b via Miramar Road**	**3.c via SR-52**	**3.d via SR 163 to Santa Fe Station**	**3.e via I-15 to Qualcomm Stadium**	**3.f via SR 163/I-8**
Travel Time	14.1 minutes	13.5 minutes	12.2 minutes	7.1 minutes	4.2 minutes	9.5 minutes
	1	**2**	**3**	**5**	**5**	**4**
Length	20.1 miles (32.3 km)	19.8 miles (31.8 km)	20.8 miles (33.5 km)	15.7 miles (25.3 km)	10.1 miles (16.3 km)	17.5 miles (28.2 km)
	2	**3**	**2**	**5**	**5**	**4**
Population /Employment Catchment	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Maximize Connectivity and Accessibility						
Intermodal Connection	This alignment would connect to the UTC Amtrak station and via the LOSSAN corridor to downtown San Diego and Lindberg Field.	This alignment would connect to the UTC Amtrak station and via the LOSSAN corridor to downtown San Diego and Lindberg Field.	This alignment would connect to the UTC Amtrak station and via the LOSSAN corridor to downtown San Diego and Lindberg Field.	Kearny Mesa station has access to SR-163 and SR-274 via Convoy St. and Mesa College Drive. It could be served by buses, and is less than 1 mile (1.6 km) from Montgomery Field, a business airport. Santa Fe Station can be accessed by car, is served by buses, and is adjacent to a major Trolley station	Qualcomm Station has access to I-15 via Friars Road, and the site is served by buses and an existing Trolley station. Montgomery Field, a business airport, is less than 3 miles away	Kearny Mesa station has access to SR-163 and SR-274 via Convoy St. and Mesa College Drive. It could be served by buses, and is less than 1 mile (1.6 km) from Montgomery Field, a business airport. Information about other stations to which route 3.f might connect is being compiled by another firm.
	3	**3**	**3**	**4**	**4**	**3**
Minimize Operating and Capital Costs						
Length	20.1 miles (32.3 km)	19.8 miles (31.8 km)	20.8 miles (33.5 km)	15.7 miles (25.3 km)	10.1 miles (16.3 km)	17.5 miles (28.2 km)

Table 4.1-3
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 3—Mira Mesa to San Diego Qualcomm Stadium

Evaluation Criteria	Segment 3 Alignments--Mira Mesa to San Diego					
	3.a via Carroll Canyon	**3.b via Miramar Road**	**3.c via SR-52**	**3.d via SR 163 to Santa Fe Station**	**3.e via I-15 to Qualcomm Stadium**	**3.f via SR 163/I-8**
	2	**3**	**2**	**5**	**5**	**4**
Operational Issues	Significant curves that reduce speeds, average speed 91 mph (146 kph).	Significant curves that reduce speeds, average speed 93 mph (150 kph).	Significant curves that reduce speeds, average speed 106 mph (171 kph).	Fewer curves better speeds, average speed 141 mph (227 kph).	Fewer curves better speeds, average speed 153 mph (246 kph).	Significant curves that reduce speeds, average speed 117 mph (188 kph).
	1	1	**2**	**4**	**4**	**2**
Construction Issues	Sensitive environment, difficult terrain	Urban environment	Urban Environment	Urban Environment, Balboa Park	Shortest length stopping short of areas of major development	Urban Environment
Capital Cost						
	2	**2**	**2**	**4**	**5**	**3**
Right-of-Way Issues/Cost	Needs new ROW through sensitive environment.	Constrained ROW densely developed area.	Constrained ROW densely developed area.	Constrained ROW densely developed area.	Constrained ROW densely developed area.	Constrained ROW densely developed area.
	3	**3**	**2**	**4**	**5**	**4**
Maximize Compatibility with Existing and Planned Development						
Land Use Compatibility and Conflicts	Crosses 0.45 mile (0.72 km) of existing residential area, perhaps 20 residences or so; crosses 0.25 miles (0.4 km) of areas graded in the 1999 aerial photo, now likely developed residential uses; crosses Miramar CC	Crosses 0.55 mile (0.8 km) of existing residential area, perhaps 22 dwellings or so; crosses 0.25 mile (0.4 km) of areas graded in the 1999 aerial photo, now likely developed residential uses; crosses 2.6 miles (4.2 km) of commercial and industrial land uses	Crosses 4.95 miles (8.0 km) of MCAS Miramar; specific potential conflicts there were compiled by another firm in the HNTB team. Crosses Scripps Ranch HS for 0.15 miles. Crosses 1.2 miles (1.9 km) of industrial uses.	Crosses 2.55 miles (4.0 km) of MCAS Miramar; specific potential conflicts there were compiled by another firm in the HNTB team. Crosses Scripps Ranch HS for 0.15 mile (0.2 km). Crosses 4.4 miles (7.1 km) of commercial or industrial uses,	Crosses 3.7 miles (6.0 km) of MCAS Miramar; specific potential conflicts there were compiled by another firm in the HNTB team. Crosses 0.6 miles (1.0 km) of residential uses, in Scripps Ranch and in Tierrasanta Murphy Canyon. The Murphy Canyon residential area is military housing. It could	Crosses 2.55 miles (4.1 km) of MCAS Miramar; specific potential conflicts there were compiled by another firm in the HNTB team. Crosses 1.2 miles (1.9 km) of residential uses, in Scripps Ranch and Linda Vista –loss of affordable housing issue. Crosses 0.15 mile (0.2 km) of Scripps Ranch HS.

Table 4.1-3
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 3—Mira Mesa to San Diego Qualcomm Stadium

Evaluation Criteria	Segment 3 Alignments--Mira Mesa to San Diego					
	3.a via Carroll Canyon	**3.b via Miramar Road**	**3.c via SR-52**	**3.d via SR 163 to Santa Fe Station**	**3.e via I-15 to Qualcomm Stadium**	**3.f via SR 163/I-8**
	(0.2 mi. [0.3 km]); crosses Hour-glass Field Park (0.25 mile [0.4 km]); crosses 0.85 mile (1.4 km) of industrial uses.		Crosses 2.45 miles (3.9 km) of Marion Bear Park south of SR-52. Non-park uses of parks established by ordinance require a 2/3 vote of the people. Crosses 1.08 miles (1.7 km) of existing residential use-loss of affordable housing issue	including more than a mile of high-rise development in downtown San Diego. Crosses 1.2 miles (1.9 km) of existing residential use-loss of affordable housing issue. Crosses Balboa Park for 0.55 mile (0.8 km). Non-park uses there require a 2/3 vote of the people	be avoided by moving the route slightly to the west. Crosses 0.15 mile (0.2 km) of Scripps Ranch HS. Crosses 1.4 miles (2.3 km) of industrial	Crosses 4.07 miles (6.5 km) of commercial or industrial uses. Crosses golf course in Mission Valley for 0.9 mile (1.5 km). Possible conflict with new planned Caltrans HQ north of Old Town
	3	**3**	1	1	**2**	**2**
Visual Quality Impacts	Factors: 100% Aerial or Depressed 0 historic and cultural sensitivity 1 parks/ landscape feature Predominantly open space and commercial Visual Assessment for Community compatibility = low /medium Visual assessment for Rider = low/medium appeal	Factors: 100% Aerial 0 historic and cultural sensitivity 2 parks & landscape features Predominantly residential and open space with areas of commercial Visual Assessment for Community compatibility = low Visual assessment for Rider = medium/low appeal	Factors: 100% Aerial 0 historic and cultural sensitivity 3 parks/ landscape feature Predominantly open space and commercial Visual Assessment for Community compatibility = low/ medium Visual assessment for Rider = low appeal	Factors: 30% Aerial or Depressed 80 % Tunnel 1 historic and cultural sensitivity 2 parks/ landscape feature Predominantly open space and commercial Visual Assessment for Community compatibility = medium Visual assessment for Rider = medium /low appeal	Factors: 50% Aerial or Depressed 50 % Tunnel 0 historic and cultural sensitivity 2 parks/ landscape feature Predominantly open space and commercial Visual Assessment for Community compatibility = high Visual assessment for Rider =low appeal	Factors: 80% Aerial or Depressed 20% tunnel 0 historic and cultural sensitivity 2 parks/ landscape feature Predominantly open space and commercial Visual Assessment for Community compatibility = high Visual assessment for Rider = medium appeal

Table 4.1-3
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 3—Mira Mesa to San Diego Qualcomm Stadium

Evaluation Criteria	Segment 3 Alignments--Mira Mesa to San Diego					
	3.a via Carroll Canyon	**3.b via Miramar Road**	**3.c via SR-52**	**3.d via SR 163 to Santa Fe Station**	**3.e via I-15 to Qualcomm Stadium**	**3.f via SR 163/I-8**
	3	**2**	**2**	**3**	**3**	**4**
Minimize Impacts to Natural Resources						
Water Resources	Carol Canyon Creek	Carol Canyon Creek Rose Canyon Creek	Carol Canyon Creek Rose Canyon San Clemente Canyon unnamed creek near Convoy Street unnamed creek near Regents Road Rose Canyon Creek	Carol Canyon Creek Rose Canyon San Clemente Canyon San Diego River	Carol Canyon Creek Rose Canyon San Clemente Canyon Murphy Canyon Elenue Canyon Shepherd Canyon Murphy Canyon San Diego River	Carol Canyon Creek Rose Canyon San Clemente Canyon San Diego River
	3	**2**	**2**	**2**	**2**	**2**
Floodplain Impacts	Carol Canyon Creek	Carol Canyon Creek Rose Canyon Creek	Carol Canyon Creek San Clemente Canyon Rose Canyon	Carol Canyon Creek Rose Canyon San Clemente Canyon San Diego River	Carol Canyon Creek Murphy Canyon ? San Diego River	Carol Canyon Creek Rose Canyon San Clemente Canyon San Diego River
	3	**3**	**3**	**3**	**3**	**3**
Wetlands	- RI, potential VP habitat at Carol Canyon Creek	RI, VP at Carol Canyon Creek Potential high quality VP habitat through MCAS Miramar	RI, VP at San Clemente Canyon Potential high quality VP habitat through MCAS Miramar	RI, VP at San Clemente Canyon Potential high quality VP habitat through MCAS Miramar	RI, VP at San Clemente Canyon Potential high quality VP habitat through MCAS Miramar	RI, VP at San Clemente Canyon Potential high quality VP habitat through MCAS Miramar
	Moderate to High	High	High	High	High	High
	2	1	1	1	1	1

Table 4.1-3
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 3—Mira Mesa to San Diego Qualcomm Stadium

Evaluation Criteria	Segment 3 Alignments--Mira Mesa to San Diego					
	3.a via Carroll Canyon	**3.b via Miramar Road**	**3.c via SR-52**	**3.d via SR 163 to Santa Fe Station**	**3.e via I-15 to Qualcomm Stadium**	**3.f via SR 163/I-8**
Threatened & Endangered Species Impacts	Sensitive forest lands in Carroll Canyon. High potential for special status species and impacts. Potential impacts to wildlife movement Constraint Level = Moderate/High	NW MCAS Miramar supports vernal pools and occupied California gnatcatcher habitat adjacent to Miramar Road. Alignment cross habitat/pools. – Impacts to T&E species may be high and unavoidable. Constraint Level = High	Venal pools and associated T&E species. California gnatcatcher habitat Close proximity to San Clemente Canyon Broadleaf Riparian Habitat. High potential for impacts to an important regional wildlife movement corridor. Constraint Level = High	See below	See below	The vernal pools at MCAS Miramar and associated T&E species: San Diego button-celery, California Orcutt grass, San Diego mesa mint, Riverside fairy shrimp, and San Diego fairy shrimp. Occupied California gnatcatcher habitat. Impact are potentially very high, difficult to minimize through either avoidance or mitigation Alignment is not close to San Diego River, thereby avoiding potential impacts.. Constraint Level = High
	2	1	1	1	1	1
Minimize Impacts to Social and Economic Resources						
Environmental Justice Impacts (Demographics)	None anticipated	None anticipated.	None anticipated.	Possible issue in Linda Vista, adjacent to SR-163, home of several ethnic minorities.	None anticipated	None anticipated.
	5	**5**	**5**	**3**	**5**	**5**
Farmland Impacts	None	None	None	None	None	None
	5	**5**	**5**	**5**	**5**	**5**

Table 4.1-3
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 3—Mira Mesa to San Diego Qualcomm Stadium

Evaluation Criteria	Segment 3 Alignments--Mira Mesa to San Diego					
	3.a via Carroll Canyon	**3.b via Miramar Road**	**3.c via SR-52**	**3.d via SR 163 to Santa Fe Station**	**3.e via I-15 to Qualcomm Stadium**	**3.f via SR 163/I-8**
Minimize Impacts to Cultural Resources						
Cultural Resources Impacts	None	None	None	Ref# 77000331 Balboa Park Ref# 74000552 George W. Marston House Ref# 76000515 El Prado Complex Ref# 79000524 Medico-Dental Building	None	None
	5	**5**	**5**	**2**	**5**	**5**
Parks and Recreation/Wildlife Refuge Impacts	**PARKS**					
	Hourglass Field Community Park, Mira Mesa	None	None	Mission Heights Park Balboa Park City Park, Centre City	None	Mission Heights Park Presidio Community Park
	RECREATION AREAS					
	None	Miramar Memorial Golf Course	None	None	None	Riverwalk Golf Course
	WILDLIFE REFUGES					
	None	Marian Bear Memorial Natural Park, Clairemont Rose Canyon Open Space, university City	Marian Bear Memorial Natural Park, Clairemont	None	None	None
	4	**4**	**4**	**2**	**5**	**4**
Maximize Avoidance of Areas with Geologic and Soils Constraints						

Table 4.1-3
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 3—Mira Mesa to San Diego Qualcomm Stadium

Evaluation Criteria	Segment 3 Alignments--Mira Mesa to San Diego					
	3.a via Carroll Canyon	**3.b via Miramar Road**	**3.c via SR-52**	**3.d via SR 163 to Santa Fe Station**	**3.e via I-15 to Qualcomm Stadium**	**3.f via SR 163/I-8**
Soils/Slope Constraints	Soils consist primarily of non-marine, marine, and terrace deposits Slope can be constructed with a 2:1 ratio, in general Low potential for landslide	Soils consist primarily of non-marine, marine, and terrace deposits Slope can be constructed with a 2:1 ratio, in general Low potential for landslide	Soils consist primarily of non-marine, marine, and terrace deposits Slope can be constructed with a 2:1 ratio, in general Low potential for landslide	Soils consist primarily of non-marine, marine, and terrace deposits Slope can be constructed with a 2:1 ratio, in general Low potential for landslide	Soils consist primarily of non-marine, marine, and terrace deposits Slope can be constructed with a 2:1 ratio, in general Low potential for landslides	Soils consist primarily of non-marine, marine, and terrace deposits Slope can be constructed with a 2:1 ratio, in general Low potential for landslide
	4	**4**	**4**	**4**	**4**	**4**
Seismic Constraints	Low to moderate potential for liquefaction The Rose Canyon Fault (Type B, MG MAX = 6.9) starts offshore 3 miles (4.8 km) west of Encinitas, follows the San Diego Freeway for 12 miles (19.3 km) and ends in the San Diego Bay approx. 1 mile (1.6 km) from shore Moderate to high potential for surface rapture at the fault location Detail investigation recommended for the potential impact of the fault on the	Low to moderate potential for liquefaction The Rose Canyon Fault (Type B, MG MAX = 6.9) starts offshore 3 miles (4.8 km) west of Encinitas, follows the San Diego Freeway for 12 miles (19.3 km) and ends in the San Diego Bay approx. 1 mile (1.6 km) from shore Moderate to high potential for surface rapture at the fault location Detail investigation recommended for the potential impact of the fault on the alignment	Low to moderate potential for liquefaction The Rose Canyon Fault (Type B, MG MAX = B) starts offshore 3 miles (4.8 km) west of Encinitas, follows the San Diego Freeway for 12 miles (19.3 km) and ends in the San Diego Bay approx. 1 mile (1.6 km) from shore Moderate to high potential for surface rapture at the fault location Detail investigation recommended for the potential impact of the fault on the	Low to moderate potential for liquefaction	Low to moderate potential for liquefaction	Low to moderate potential for liquefaction The Rose Canyon Fault (Type B, MG MAX = 6.9) starts offshore 3 miles (4.8 km) west of Encinitas, follows the San Diego Freeway for 12 miles (19.8 km) and ends in the San Diego Bay approx. 1 mile (1.6 km) from shore Moderate to high potential for surface rupture at the fault location Detail investigation recommended for the potential impact of the fault on the alignment

Table 4.1-3
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Alignment Evaluation Matrix
Segment 3—Mira Mesa to San Diego Qualcomm Stadium

Evaluation Criteria	Segment 3 Alignments--Mira Mesa to San Diego					
	3.a via Carroll Canyon	**3.b via Miramar Road**	**3.c via SR-52**	**3.d via SR 163 to Santa Fe Station**	**3.e via I-15 to Qualcomm Stadium**	**3.f via SR 163/I-8**
	alignment		alignment			
	3	**3**	**3**	**4**	**4**	**3**
Maximize Avoidance of Areas with Potential Hazardous Materials						
Hazardous Materials/ Waste Constraints	No sites	No sites	No sites	1 hazardous waste generator 1 hazardous waste release site	1 hazardous waste generator	1 hazardous waste generator 1 hazardous waste release site
	5	**5**	**5**	**5**	**5**	**5**

Table 4.1-4a
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
Los Angels Union Station to Fullerton Transportation Center

Evaluation Criteria	Station Options				
	West of the I-605 in El Monte, UP Colton	**West of the I-605 in El Monte, I-10**	**West of the I-605 in South El Monte**	**Norwalk, Metrolink Station**	**Fullerton Transportation Center**
Travel Time	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Length	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Population / Employment Catchment (10-mile radius)	1,838,409	1,841,478	2,141,740	2,331,416	1,960,424
	4	**4**	**5**	**5**	**5**
Maximize Connectivity and Accessibility					
Intermodal Connection	Bus: Yes Metrolink: No Airport: No	Bus: Yes Metrolink: No Airport: No	Bus: Yes Metrolink: No Airport: No	Bus: Yes Metrolink: Yes Airport: No	Bus: Yes Metrolink: Yes Airport: No
	3	**3**	**3**	**5**	**5**
Minimize Operating and Capital Costs					
Length	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Issues	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Construction Issues	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Capital Cost	Urban Station	Urban Station	Urban Station	Urban Station	Urban Station
Right-of-Way Issues/Cost	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Table 4.1-4a
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
Los Angels Union Station to Fullerton Transportation Center

Evaluation Criteria	Station Options				
	West of the I-605 in El Monte, UP Colton	**West of the I-605 in El Monte, I-10**	**West of the I-605 in South El Monte**	**Norwalk, Metrolink Station**	**Fullerton Transportation Center**
Maximize Compatibility with Existing and Planned Development					
Land Use Compatibility and Conflicts	Sensitive Uses: Schools	Sensitive Uses: Schools	None	None	Sensitive Uses: Police Station
	4	**5**	**5**	**5**	**5**
Visual Quality Impacts	Large scale environment No historical significance High compatibility	Small scale environment No historical significance Medium compatibility	Small scale environment No historical significance Medium compatibility	Small scale environment No historical significance Medium compatibility	Small scale environment Historical significance Low/Medium compatibility
	5	**3**	**3**	**3**	**2**
Minimize Impacts to Natural Resources					
Water Resources	SEE DISCUSSION IN ALIGNMENT TABLES 4.1-4 — 4.1-6				
	5	**4**	**3**	**4**	**4**
Floodplain Impacts	SEE DISCUSSION IN ALIGNMENT TABLES 4.1-4 — 4.1-6				
	5	**5**	**5**	**5**	**5**
Wetlands	- PE at San Gabriel River and Walnut Creek	- PE at San Gabriel River and Walnut Creek	- PE at San Gabriel River and Walnut Creek	None	None
	Moderate	Moderate	Moderate	Low	Low
	4	**4**	**4**	**5**	**5**
Threatened and Endangered Species Impacts	No potential impacts Constraint Level = Low	No potential impacts Constraint Level = Low	No potential impacts Constraint Level = Low	No potential impacts Constraint Level = Low	No potential impacts Constraint Level = Low

Table 4.1-4a
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
Los Angels Union Station to Fullerton Transportation Center

Evaluation Criteria	Station Options				
	West of the I-605 in El Monte, UP Colton	**West of the I-605 in El Monte, I-10**	**West of the I-605 in South El Monte**	**Norwalk, Metrolink Station**	**Fullerton Transportation Center**
	5	**5**	**5**	**5**	**5**
Minimize Impacts to Social and Economic Resources					
Environmental Justice Impacts (Demographics)	Low-Mod Area: N High Minority: Y Both LM/Minority: N	Low-Mod Area: Y High Minority: Y Both LM/Minority: Y	Low-Mod Area: Y High Minority: Y Both LM/Minority: Y	Low-Mod Area: N High Minority: Y Both LM/Minority: N	Low-Mod Area: N High Minority: N Both LM/Minority: N
	3	1	1	**4**	**5**
Farmland Impacts	None	None	None	None	None
	5	**5**	**5**	**5**	**5**
Minimize Impacts to Cultural Resources					
Cultural Resources Impacts	None	None	None	None	None
	5	**5**	**5**	**5**	**4**
Parks and Recreation/ Wildlife Refuge Impacts	No impacts	No impacts	No impacts	No impacts	No impacts
	5	**5**	**5**	**5**	**5**
Maximize Avoidance of Areas with Geologic and Soils Constraints					
Soils/Slope Constraints	Soils consist of alluvium Slope with a ratio of 2:1 can be constructed, in general Low potential for landslide	Soils consist of alluvium Slope with a ratio of 2:1 can be constructed, in general Low potential for landslide	Soils consist of alluvium Slope with a ratio of 2:1 can be constructed, in general Low potential for landslide	Soils consist of alluvium and older lake deposits Slope with a ratio of 2:1 can be constructed, in general Low potential for landslide	Soils consist of alluvium and older lake deposits Slope with a ratio of 2:1 can be constructed, in general Low to moderate potential for landslide
	4	**4**	**4**	**4**	**4**

Table 4.1-4a
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
Los Angels Union Station to Fullerton Transportation Center

Evaluation Criteria	Station Options				
	West of the I-605 in El Monte, UP Colton	**West of the I-605 in El Monte, I-10**	**West of the I-605 in South El Monte**	**Norwalk, Metrolink Station**	**Fullerton Transportation Center**
Seismic Constraints	Moderate to high potential for liquefaction	Moderate to high potential for liquefaction	Moderate to high potential for liquefaction Workman Hill Fault, an extension of Santa Monica Fault Zone (Type B, MG MAX = 6.6) runs through this station Moderate to high potential for surface rapture at the fault location Detail investigation recommended for the potential impact of the fault on the station	Moderate to high potential for liquefaction	Moderate to high potential for liquefaction
	4	**4**	**4**	**4**	**4**
Maximize Avoidance of Areas with Potential Hazardous Materials					
Hazardous Materials/ Waste Constraints	No sites	No sites	No sites	No sites	No sites

Table 4.1-4b
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
City of Industry to Ontario, Southside Metrolink Station

Evaluation Criteria	Station Options				
	City of Industry, Metrolink Station	**Cal Poly Pomona, Northeast side of Campus**	**Pomona, Metrolink Station**	**Ontario Airport, Northside**	**Ontario, Southside Metrolink Station**
Travel Time	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Length	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Population / Employment Catchment (10-mile radius)	1,324,214	1,161,729	1,040,213	861,152	887,080
	5	**4**	**4**	**3**	**3**
Maximize Connectivity and Accessibility					
Intermodal Connection	Bus: Yes Metrolink: Yes Airport: No	Bus: Yes Metrolink: No Airport: No	Bus: Yes Metrolink: No Airport: No	Bus: Yes Metrolink: No Airport: Yes	Bus: Yes Metrolink: Yes Airport: No
	4	**2**	**5**	**4**	**3**
Minimize Operating and Capital Costs					
Length	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Issues	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Construction Issues	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Capital Cost	Suburban Station	Suburban Station	Urban Station	Suburban Station	Suburban Station
Right-of-Way Issues/Cost	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Maximize Compatibility with Existing and Planned Development					
Land Use Compatibility and	Sensitive Uses: None	Sensitive Uses:	Sensitive Uses: Park/Office	Sensitive Uses: None	Sensitive Uses: None

Table 4.1-4b
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
City of Industry to Ontario, Southside Metrolink Station

Evaluation Criteria	Station Options				
	City of Industry, Metrolink Station	**Cal Poly Pomona, Northeast side of Campus**	**Pomona, Metrolink Station**	**Ontario Airport, Northside**	**Ontario, Southside Metrolink Station**
Conflicts		University			
	5	**3**	**4**	**5**	**5**
Visual Quality Impacts	Small scale environment No historical significance Medium compatibility	Medium scale environment No historical significance Medium/high compatibility	Small scale environment Historical significance Low compatibility	Large scale environment No historical significance High compatibility	Large scale environment No historical significance High compatibility
	3	**4**	1	**5**	**5**
Minimize Impacts to Natural Resources					
Water Resources	SEE DISCUSSION IN ALIGNMENT TABLES 4.1-4 — 4.1-6				
	4	**4**	**5**	**4**	**5**
Floodplain Impacts	SEE DISCUSSION IN ALIGNMENT TABLES 4.1-4 — 4.1-6				
	5	**5**	**5**	**5**	**5**
Wetlands	- RI at Diamond Bar Creek	None	None	None	None
	Moderate	Low	Low	Low	Low
	4	**5**	**5**	**5**	**5**
Threatened and Endangered Species Impacts	No potential impacts Constraint Level = Low	No potential impacts Constraint Level = Low	No potential impacts Constraint Level = Low	No potential impacts Constraint Level = Low	No potential impacts Constraint Level = Low
	5	**5**	**5**	**5**	**5**
Minimize Impacts to Social and Economic Resources					
Environmental Justice Impacts (Demographics)	Low-Mod Area: N High Minority: Y	Low-Mod Area: N High Minority: N	Low-Mod Area: Y High Minority: Y	Low-Mod Area: Y High Minority: Y	Low-Mod Area: N High Minority: Y

Table 4.1-4b
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
City of Industry to Ontario, Southside Metrolink Station

Evaluation Criteria	Station Options				
	City of Industry, Metrolink Station	**Cal Poly Pomona, Northeast side of Campus**	**Pomona, Metrolink Station**	**Ontario Airport, Northside**	**Ontario, Southside Metrolink Station**
	LM/Minority: N	LM/Minority: N	LM/Minority: Y	LM/Minority: Y	Airport: N
	3	**5**	**2**	**3**	**4**
Farmland Impacts	None	University Agricultural Land	None	None	None
	5	**3**	**5**	**5**	**5**
Minimize Impacts to Cultural Resources					
Cultural Resources Impacts	None	None	Ref# 86000408 Pomona YMCA Building	None	None
	5	**5**	**2**	**5**	**5**
Parks and Recreation/ Wildlife Refuge Impacts	No impacts	No impacts	No impacts	No impacts	No impacts
	5	**5**	**5**	**5**	**5**
Maximize Avoidance of Areas with Geologic and Soils Constraints					
Soils/Slope Constraints	Bedrock consists of sandstone Slope with a 2:1 ratio can be constructed, in general. Steeper slope may be feasible Low potential for landslide	Bedrock consists of andesitic volcanics Slope with a 2:1 ratio can be constructed, in general. Steeper slope may be feasible Low potential for landslide	Soils consist of younger fan deposits Slope with a 2:1 ratio can be constructed, in general Low potential for landslide	Soils consist of younger fan deposits Slope with a 2:1 ratio can be constructed, in general Low potential for landslide	Soils consist of wind-blown sands and alluvial deposits of modern washes Slope with a 2:1 ratio can be constructed, in general Low potential for landslide
	4	**4**	**4**	**4**	**4**
Seismic Constraints	Low to moderate potential for liquefaction	Low to moderate potential for	Moderate to high potential for liquefaction	Moderate to high potential for	Moderate to high potential for liquefaction

Table 4.1-4b
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
City of Industry to Ontario, Southside Metrolink Station

Evaluation Criteria	Station Options				
	City of Industry, Metrolink Station	**Cal Poly Pomona, Northeast side of Campus**	**Pomona, Metrolink Station**	**Ontario Airport, Northside**	**Ontario, Southside Metrolink Station**
		liquefaction The San Jose Fault runs through this station (Type B, MG MAX = 6.5) Moderate to high potential for surface rapture at the fault location Detail investigation recommended for the potential impact of the fault on the station		liquefaction	
	4	**3**	**4**	**4**	**4**
Maximize Avoidance of Areas with Potential Hazardous Materials					
Hazardous Materials/ Waste Constraints	No sites	No sites	No sites	No sites	No sites
	5	**5**	**5**	**5**	**5**

Table 4.1-4c
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
San Bernardino to March ARB

Evaluation Criteria	Station Options				
	UP Colton Line / San Bernardino	**San Bernardino Santa Fe Depot**	**Downtown Riverside at Metrolink Station**	**UC Riverside Campus**	**March ARB, West of I-215**
Travel Time	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Length	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Population /Employment Catchment (10-mile radius)	1,324,442	1,324,214	787,174	724,813	426,642
	4	**5**	**3**	**3**	**3**
Maximize Connectivity and Accessibility					
Intermodal Connection	Bus: No Metrolink: No Airport: No	Bus: Yes Metrolink: Yes Airport: No	Bus: Yes Metrolink: No Airport: No	Bus: Yes Metrolink: No Airport: No	Bus: Yes Metrolink: No Airport: Yes
	1	**4**	**5**	**3**	**2**
Minimize Operating and Capital Costs					
Length	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Issues	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Construction Issues	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Capital Cost	Urban Station	Urban Station	Urban Station	Urban Station	Suburban Station
Right-of-Way Issues/Cost	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Table 4.1-4c
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
San Bernardino to March ARB

Evaluation Criteria	Station Options				
	UP Colton Line/ San Bernardino	**San Bernardino Santa Fe Depot**	**Downtown Riverside at Metrolink Station**	**UC Riverside Campus**	**March ARB, West of I-215**
Maximize Compatibility with Existing and Planned Development					
Land Use Compatibility and Conflicts	Sensitive Uses: None	Sensitive Uses: None Historic Santa Fe Depot, Urban Redevelopment Plan.	Sensitive Uses: Public Administration Building and Local Park	Sensitive Uses: University	Sensitive Uses: Military
	5	**3**	**4**	**2**	**3**
Visual Quality Impacts	Medium scale environment No historical significance Medium/high compatibility	Medium scale environment Historical Depot High compatibility	Small scale environment Historical significance Medium compatibility	Medium Scale Environment No Historical Significance Medium/high compatibility	Large scale environment No Historical significance High compatibility
	4	**3**	**3**	**4**	**5**
Minimize Impacts to Natural Resources					
Water Resources	SEE DISCUSSION IN ALIGNMENT TABLES 4.1-4 — 4.1-6				
	4	**5**	**5**	**5**	**4**
Floodplain Impacts	SEE DISCUSSION IN ALIGNMENT TABLES 4.1-4 — 4.1-6				
	5	- RI at Diamond Bar Creek	**5**	**5**	**5**
Wetlands	None	None	None	None	None
	4	**5**	**5**	**5**	**4**
Threatened and Endangered Species Impacts	No Potential impacts Constraint Level = Low	No potential impacts Constraint Level = Low	No potential impacts Constraint Level = Low	No potential impacts Constraint Level = Low	No likely impacts. Stephen's Kangaroo Rat habitat in the vicinity Constraint Level = Low/

Table 4.1-4c
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
San Bernardino to March ARB

Evaluation Criteria	Station Options				
	UP Colton Line / San Bernardino	**San Bernardino Santa Fe Depot**	**Downtown Riverside at Metrolink Station**	**UC Riverside Campus**	**March ARB, West of I-215**
	4	**5**	**5**	**5**	**4**
Minimize Impacts to Social and Economic Resources					
Environmental Justice Impacts (Demographics)	Low-Mod Area: Y High Minority: Y Both LM/Minority: Y	Low-Mod Area: Y High Minority: Y LM/Minority: Y	Low-Mod Area: Y High Minority: Y Both LM/Minority: Y	Low-Mod Area: Y High Minority: Y Both LM/Minority: Y	Low-Mod Area: Y High Minority: N Both LM/Minority: N
	2	1	1	**2**	**3**
Farmland Impacts	None	None	None	None	None
	5	**5**	**5**	**5**	**5**
Minimize Impacts to Cultural Resources					
Cultural Resources Impacts	None	None	Ref# 80000833 Riverside-Arlington Heights Fruit Exchange	None	None
	5	**5**	**2**	**5**	**5**
Parks and Recreation / Wildlife Refuge Impacts	No impacts	No impacts	No impacts	No impacts	No impacts
	5	**5**	**5**	**5**	**5**
Maximize Avoidance of Areas with Geologic and Soils Constraints					
Soils / Slope Constraints	Soils consist of alluvium and older lake deposits Slope with a 2:1 ratio can be constructed Low potential for landslide	Bedrock consists of sandstone Slope with a 2:1 ratio can be constructed, in general. Steeper slope may be feasible Low potential for landslide	Soils consist of older lake deposits Slope with a 2:1 ratio can be constructed Low potential for landslide	Soils and rock consist of alluvium and granitic rock Slope with a 2:1 ratio can be constructed Low to moderate potential for landslide	Soils consist of alluvium Slope with a 2:1 ratio can be constructed Low to moderate potential for landslide

Table 4.1-4c
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
San Bernardino to March ARB

Evaluation Criteria	Station Options				
	UP Colton Line/ San Bernardino	**San Bernardino Santa Fe Depot**	**Downtown Riverside at Metrolink Station**	**UC Riverside Campus**	**March ARB, West of I-215**
	4	**4**	**4**	**4**	**4**
Seismic Constraints	Low to Moderate potential for liquefaction	Low to moderate potential for liquefaction	Moderate potential for liquefaction	Low to moderate potential for liquefaction	Moderate potential for liquefaction
	4	**4**	**4**	**4**	**4**
Maximize Avoidance of Areas with Potential Hazardous Materials					
Hazardous Materials/ Waste Constraints	No sites	No sites	No sites	No sites	No sites
	5	**5**	**5**	**5**	**5**

Table 4.1-4d
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
Murrieta to Mira Mesa

Evaluation Criteria	Station Options				
	Murrieta, at I-15 and I-215 Interchange	**Temecula-Murrieta Border, near Winchester Interchange**	**Escondido at the SR 78 and I-15 Interchange**	**Escondido Transit Center**	**Mira Mesa**
Travel Time	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Length	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Population /Employment Catchment (10-mile radius)	173,733	154,442	700,000	700,000	500,000
	1	1	**3**	**3**	**2**
Maximize Connectivity and Accessibility					
Intermodal Connection	Bus: Yes Metrolink: No Airport: No	Bus: Yes Metrolink: No Airport: No	The site has direct access to Mission Road, Andreason Drive, and a rail spur. It is located one mile from access to SR-78 and to I-15. It could be served by bus transit	The site has direct access to Centre City Parkway and to Valley Parkway. It is within 1/8 mile of Escondido Transit Center, and 0.25-mile from a rail spur. It is less than 0.7 mile from access to SR-78 or to I-15	The site has direct access to Scripps Ranch Blvd., and then to Mira Mesa Blvd. and to I-15. Rail access is at least 3 miles away. The site could be served by bus transit, and it is ¾ mile from a Park-and-Ride lot on Mira Mesa Boulevard
	3	1	**4**	**4**	**3**
Minimize Operating and Capital Costs					
Length	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Operational Issues	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Construction Issues	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable

Table 4.1-4d
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
Murrieta to Mira Mesa

Evaluation Criteria	Station Options				
	Murrieta, at I-15 and I-215 Interchange	**Temecula-Murrieta Border, near Winchester Interchange**	**Escondido at the SR 78 and I-15 Interchange**	**Escondido Transit Center**	**Mira Mesa**
Capital Cost	Rural Station	Suburban Station	Urban Station	Urban Station	Suburban Station
Right-of-Way Issues/Cost	Not Applicable	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Maximize Compatibility with Existing and Planned Development					
Land Use Compatibility and Conflicts	Sensitive Uses: None	Sensitive Uses: None	The site cuts diagonally across the street grid, and would cause removal of 10 or more industrial or commercial buildings. How-ever, the area is designated for general industrial and planned industrial uses, and is within the boundaries of the Escondido Redevelopment Project	The site is oriented to the street grid, but would still impact several existing industrial and commercial operations. A City fire station is located immediately to the west of the site. The area is designated for Planned Industrial use and SPA #9. It is also within the Escondido Redevelopment Project boundaries	This site was vacant in 1999, but many new residences have been built in the vicinity since then. All now-vacant land is designated for future residential use. City of San Diego Planning Dept. personnel recommended that this station site be relocated to area near Miramar Comm-unity College, west of I-15
	5	**5**	**3**	**4**	**2**
Visual Quality Impacts	Medium scale environment No historical significance Medium/high compatibility	Medium scale environment No historical significance Medium/high compatibility	Medium scale environment No historical significance Medium/high compatibility	Medium scale environment No historical significance Medium/high compatibility	Medium scale environment No historical significance Medium/high compatibility
	4	**4**	**4**	**4**	**4**
Minimize Impacts to Natural Resources					

Table 4.1-4d
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
Murrieta to Mira Mesa

Evaluation Criteria	Station Options				
	Murrieta, at I-15 and I-215 Interchange	**Temecula-Murrieta Border, near Winchester Interchange**	**Escondido at the SR 78 and I-15 Interchange**	**Escondido Transit Center**	**Mira Mesa**
Water Resources	SEE DISCUSSION IN ALIGNMENT TABLES 4.1-4 — 4.1-6				
	5	**4**	**5**	**5**	**5**
Floodplain Impacts	SEE DISCUSSION IN ALIGNMENT TABLES 4.1-4 — 4.1-6				
	5	**5**	**3**	**3**	**3**
Wetlands	None	- RI at Murrieta Creek	None	None	None
	3	**4**	**5**	**5**	**4**
Threatened and Endangered Species Impacts	Potential impacts to Stephen's Kangaroo Rat Constraint Level = Low/Moderate	Potential impacts to Stephen's Kangaroo Rat Constraint Level = Low/Moderate	No potential impacts Constraint Level = Low	No potential impacts Constraint Level = Low	Potential California gnatcatcher habitat and other T and E species associated with Coastal Sage Scrub habitat. High impacts if T and E species present. Constraint Level = Moderate/High
	4	**4**	**5**	**5**	**3**
Minimize Impacts to Social and Economic Resources					
Environmental Justice Impacts (Demographics)	Low-Mod Area: N High Minority: Y Both LM/Minority: N	Low-Mod Area: N High Minority: Y Both LM/Minority: N	None anticipated.	None anticipated from the station site, but there could be some associated with the route through Escondido	None anticipated.
	3	**2**	**5**	**3**	**5**
Farmland Impacts	None	None	None	None	None
	5	**5**	**5**	**5**	**5**

Table 4.1-4d
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
Murrieta to Mira Mesa

Evaluation Criteria	Station Options				
	Murrieta, at I-15 and I-215 Interchange	**Temecula-Murrieta Border, near Winchester Interchange**	**Escondido at the SR 78 and I-15 Interchange**	**Escondido Transit Center**	**Mira Mesa**
Minimize Impacts to Cultural Resources					
Cultural Resources Impacts	None	None	None	None	None
	5	**5**	**5**	**5**	**5**
Parks and Recreation/ Wildlife Refuge Impacts	No impacts	No impacts	None	None	None
	5	**5**	**5**	**5**	**5**
Maximize Avoidance of Areas with Geologic and Soils Constraints					
Soils/Slope Constraints	Soils consist of alluvium and older lake deposits Slope with a 2:1 ratio can be constructed Low potential for landslide	Soils consist of alluvium and older lake deposits Slope with a 2:1 ratio can be constructed Low to moderate potential for landslide	Soils consist primarily of nonmarine, marine, and terrace deposits Slope can be constructed with a 2:1 ratio, in general Low potential for landslide	Soils and bedrock consist of older lake deposits and granitic rock Slope can be constructed with a 2:1 ratio, in general. Steeper slope may be feasible Moderate potential for landslide	Soils consist primarily of nonmarine, marine, and terrace deposits Slope can be constructed with a 2:1 ratio, in general Low potential for landslide
	4	**4**	**4**	**3**	**4**
Seismic Constraints	Moderate potential for liquefaction One major fault zone between Paoma Valley (to the north) and Temecula (to the south) runs through the station: Elsinore Fault (Type B, MG	Low to moderate potential for liquefaction	Low to moderate potential for liquefaction	Low to moderate potential for liquefaction	Low to moderate potential for liquefaction

Table 4.1-4d
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
Murrieta to Mira Mesa

Evaluation Criteria	**Station Options**				
	Murrieta, at I-15 and I-215 Interchange	**Temecula-Murrieta Border, near Winchester Interchange**	**Escondido at the SR 78 and I-15 Interchange**	**Escondido Transit Center**	**Mira Mesa**
	MAX = 6.8) Moderate to high potential for surface rapture at the fault location Detail investigation recommended for the potential impact of the fault on the station				
	3	**4**	**4**	**4**	**4**
Maximize Avoidance of Areas with Potential Hazardous Materials					
Hazardous Materials/ Waste Constraints	No sites	No sites	No sites	No sites	No sites
	5	**5**	**5**	**5**	**5**

Table 4.1-4e
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
Kearny Mesa to Qualcomm Stadium

Evaluation Criteria	**Station Options**				
	Kearny Mesa near Montgomery Field	**Qualcomm Stadium**			
Travel Time	Not Applicable	Not Applicable			
Length	Not Applicable	Not Applicable			
Population / Employment Catchment	1.2 million	1.2 million			
	3	**3**			
Maximize Connectivity and Accessibility					
Intermodal Connection	The site has direct access to Convoy St., Kearny Mesa Road, and Linda Vista Road. Access to the freeway system is within one mile. The site could be served by bus. Montgomery Field is less than 1 mile away. However, the nearest rail access is 3.6 miles away, near I-5.	The site has direct access to Friars Road, San Diego Mission Road, and Mission Village Dr. Access to I-15 is 0.25-mile away. The site is served by the Trolley, and by bus. Montgomery Field is within 3 miles.			
	4	**4**			
Minimize Operating and Capital Costs					
Length	Not Applicable	Not Applicable			
Operational Issues	Not Applicable	Not Applicable			
Construction Issues	Not Applicable	Not Applicable			
Capital Cost	Suburban Station	Terminal Station			

Table 4.1-4e
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
Kearny Mesa to Qualcomm Stadium

Evaluation Criteria	Station Options				
	Kearny Mesa near Montgomery Field	**Qualcomm Stadium**			
Right-of-Way Issues/Cost	Not Applicable	Not Applicable			
Maximize Compatibility with Existing and Planned Development					
Land Use Compatibility and Conflicts	The site would result in removal of 0.25 mile of commercial/ industrial uses, including 2 office buildings. With underground station location, potential conflicts with Convoy St. and transmission line along I-805 would be minimized.	The proposed site would result in a loss of parking at Qualcomm Stadium, and also re-move a commercial office building from the south side of San Diego River. The later could be mitigated by moving the site 0.1 mile north. Loss of parking could be mitigated by parking structures. The site could also conflict with the existing Trolley line unless carefully sited			
	4	**4**			
Visual Quality Impacts	Large scale environment No historical significance High compatibility	Large scale environment No historical significance High compatibility			
	5	**5**			
Minimize Impacts to Natural Resources					
Water Resources	SEE DISCUSSION IN ALIGNMENT TABLES 4.1-4 — 4.1-6				
	5	**4**			
Floodplain Impacts	SEE DISCUSSION IN ALIGNMENT TABLES 4.1-4 — 4.1-6				
	3	**3**			
Wetlands	None	None			
	5	**5**			

Table 4.1-4e
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
Kearny Mesa to Qualcomm Stadium

Evaluation Criteria	Station Options				
	Kearny Mesa near Montgomery Field	**Qualcomm Stadium**			
Threatened and Endangered Species Impacts	No or very low potential for habitat. Constraint Level = Low	Possible T and E species habitat impacts associated with Murphy Canyon Constraint Level = Low/Moderate			
	5	**4**			
Minimize Impacts to Social and Economic Resources					
Environmental Justice Impacts (Demographics)	None anticipated.	None anticipated			
	5	**5**			
Farmland Impacts	None	None			
	5	**5**			
Minimize Impacts to Cultural Resources					
Cultural Resources Impacts	None	None			
	5	**5**			
Parks and Recreation/ Wildlife Refuge Impacts	None	None			
	5	**5**			
Maximize Avoidance of Areas with Geologic and Soils Constraints					
Soils/Slope Constraints	Soils consist primarily of non-marine, marine, and terrace deposits Slope can be constructed with a 2:1 ratio, in general Low potential for landslide	Soils consist primarily of non-marine, marine, and terrace deposits Slope can be constructed with a 2:1 ratio, in general Low potential for landslide			
	4	**4**			
Seismic Constraints	Low to moderate potential for	Low to moderate potential for			

Table 4.1-4e
Los Angeles-to-San Diego-via-Inland Empire High-Speed Train Station Evaluation Matrix
Kearny Mesa to Qualcomm Stadium

Evaluation Criteria	Station Options				
	Kearny Mesa near Montgomery Field	**Qualcomm Stadium**			
	liquefaction	liquefaction			
	4	**4**			
Maximize Avoidance of Areas with Potential Hazardous Materials					
Hazardous Materials/ Waste Constraints	No sites	No sites			
	5	**5**			

5.0 REFERENCES

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6.0 PERSONS AND AGENCIES CONSULTED

The following is a list of people contacted during the preparation of this report.

Bay Keepers Council meeting. Presentation to members of San Diego Bay Keepers including members of Sierra Club, Environmental Health Coalition, the Audubon Society and two members that are uniquely part of San Diego Bay Keepers. May 23, 2001, 4:00 p.m., at Bay Keepers office in San Diego.

Bishop, Rick. Executive Director. Taylor-Burger Young, Ruth. Deputy Executive Director. Ruddick, Steve. Planning Director. In-person meeting at West Riverside Council of Governments. March 21, 2001, 9:30 a.m.

Bowlby, Eric. Citizen Chair, Sierra Club. Raskin, Abby. Assistant, Sierra Club. Smith, Geoffrey. Anderson, Janet. Chair, Citizens Conservation Committee. Conservation Coordination, San Diego Chapter, Sierra Club. Meeting with Sierra Club officials. March 20, 2001, 10:00 a.m.

Caughlin, Thomas. Colonel. Thornton, Laura. Staff Planner. O'Leary, T. J. Lieutenant Colonel. March 22, 2001, 10:00 a.m., at Miramar Air Reserve Base.

CETAP. Presentation to CETAP board and public attendees. May 1, 2001, 9:00 a.m., at Registrar of Voters Hall in Riverside.

Conway, Nick. Executive Director. Fasana, John. Chair, Council of Governments and Board Member of MTA. Meeting with representatives of San Gabriel Council of Governments. February 27, 2001, 10:00 a.m., at SGVCOG offices.

Delino, Ken. March Air Reserve Base Planner. Telephone conversation on May 3, 2001, 3:00 p.m.

Haley, Eric. Executive Director. Bechtel, Cathy. Director of Planning and Programming. Henderson, Jim. Consultant. Smith, Steve. Consultant. In-person meeting with RCTC. February 22, 2001, 10:00 a.m.

Inland Empire Economic Partnership. Presentation by Linda Bohlinger, Norm King/ SANBAG, Haley, Eric/RCTC, Riveria, Jens/Manager of Ontario International Airport, to the members of the Inland Empire Economic Partnership. April 25, 2001, 11:30 a.m., at Mission Inn, Riverside.

Loveland, George, Sr. Deputy City Manager. Halbert, Gary. Deputy Director of Transportation. Pavargadi, Siavash. City Engineer. Qasem, Labib. Associate Engineer-Traffic. Meeting with City of San Diego staff. March 21, 2001, 1:00 p.m., at San Diego City Hall.

Marquez, Frank. Executive Director. Cullen, Elaine. liaison with LAEDC. Meeting with staff representatives of San Gabriel Valley Economic Partnership Board. February 21, 2001, 2:30 p.m.

Metropolitan Transit Authority. Meeting with Authority representatives including airport, Foothill Transit, Metrolink. May 1, 2001, 2:30 p.m., at Authority offices.

Petrek, Jay. City Planner. Telephone conversations and meeting to discuss land use in City of San Diego. May 15-May 19, 2001, at San Diego City Hall.

Presentation to members of San Gabriel Valley Economic Partnership. March 15, 2001, 8:00 a.m.

Presentation to members of the Monday Morning Group including business executives and other stakeholders in Riverside. March 22, 2001, 7:30 a.m.

Presentation to San Gabriel Valley Council of Governments Transportation Committee. Thursday, April 5, 2001, 4:00 p.m., at Council offices.

Presentation to SANDAG, Planners and Engineers combination meeting regarding coastal and inland corridor routes. May 30, 2001, 9:30 a.m. at SANDAG offices.

Presentation to SGVCOG Engineers meeting. May 21, 2001, 1:00 p.m., at Sheraton Four Points Hotel in Monrovia.

Presentation to SGVCOG Planners meeting. Representatives from Alhambra, Covina, Monrovia, Montebello, Monterrey Park, San Gabriel and Walnut. May 8, 2001, 12:00 p.m., at West Covina City Hall.

Presentation to West Riverside Council of Governments City Managers meeting. April 19, 2001, 10:00 a.m., at RCTC offices.

Richman, Rick. Chief Executive Officer. Neeley, Sharon. Director of Transportation Policy. Meeting with Alameda Corridor East Construction Authority. February 21, 2001, 1:30 p.m., at ACE offices in Irwindale.

SANBAG Comprehensive Transportation Plan meeting. Information exchange and presentation to CTP. May 14, 2001, 3:00 p.m., at SANBAG offices.

Schumacher, Bill. Transportation Planning Engineer. Meeting with Metropolitan Transit Development Board staff planner. March 20, 2001, 3:00 p.m.

Valles, Judith. Mayor, City of San Bernardino. Meeting with mayor of San Bernardino. April 27, 2001, 10:00 a.m., at San Bernardino City Hall.

WRCOG Planners and Engineers Agency Coordination meeting. Presentation to planners meeting. April 26, 2001, 10:00 a.m., at RCTC offices.

7.0 PREPARERS

HNTB CORPORATION

Linda Bohlinger Vice President HNTB Corporation	Doctoral course work, Public Administration, University of Southern California; M.P.A., Public Administration, University of Southern California; B.A., Spanish, University of California, Santa Barbara. 24 years experience in the transportation industry. Currently a National Vice President, Rail Services, with the HNTB Corporation. Most recent position was as the Executive Director of South Florida's Tri-County Commuter Rail Authority (Tri-Rail). Held previous positions as the CEO for the Los Angeles County Metropolitan Transportation Authority and other positions in California state and regional government. • Project Manager • Rail and Funding Analysis
John S. Kulpa Chief Transportation Planner HNTB Corporation	Ph.D., Business Management, LaSalle University; M.S., Urban and Environmental Studies, Rensselaer Polytechnic Institute; B.A., Political Science, New York University. 21 years experience in transportation planning and engineering. • Alignment Development and Evaluation
Charles W. Causier, AICP Principal Planner HNTB Corporation	MUP, Urban Planning, University of Wisconsin-Milwaukee; M.A., History, University of Wisconsin- Milwaukee, B.A., History, Political Science, Carroll College. 23 years experience in urban and transportation planning. • Planning Team Manager
Mark Fricke, P.E. Senior Transportation Engineer HNTB Corporation	B.S. Civil Engineering, Metropolitan State College, Denver, CO 16 years experience in the completion of alignment studies, interchange studies, preliminary and final design plans. • Alignment Analysis

Larry Kuester Senior CADD Technician HNTB Corporation	2 years college, Geology and Associated Arts. 15 years CADD experience. • Alignments and Station Layout • Presentation graphics
Charles O'Reilly Senior Vice President HNTB Corporation	B.S., Civil Engineering, University of Massachusetts, Lowell; M.B.A., Boston University. 25 years experience in planning, design and construction of rail transport infrastructure • Project Principal
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CH2M HILL

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Daniela Pappada Environmental Planner	B.A., Environmental Analysis and Design, University of California at Irvine. 1 year of experience in environmental planning. • Analysis of Parks and Recreation/Wildlife Refuge Impacts
Catherine Quinn Senior Hydrogeologist	M.S., Environmental Engineering, Water Quality Control, University of Southern California; B.Sc., Earth Sciences/Geology, West Chester University of Pennsylvania. 17 years experience in hydrogeologic analysis to support water resource management and environmental compliance. • Alignment Analysis

COTTON / BRIDGES / ASSOCIATES, INC.

Enabell Diaz GIS/CAD Technician Cotton/Bridges/Associates	B.S., Computer Visualization Technology, ITT Technology. 2 years of experience in GIS and CAD programming. • GIS and CAD Analyst
Jeffrey A. Henderson, AICP Urban Planner/GIS Manager Cotton/Bridges/Associates	M.A., Urban Planning, University of Washington-Seattle; B.A., Sociology, Whittier College. 6 years of GIS and planning experience. • GIS Coordinator and Analyst
Mark Hoffman Senior Planner Cotton/Bridges/Associates	M.A., Planning and Development, University of Southern California; M.A., Public Policy, University of Southern California; B.S., Public Administration, Biola University. 10 years of planning and public policy analysis. • Land Use Assessment
David J. Preece, AICP Director of Environmental Affairs Cotton/Bridges/Associates	Doctoral course work, Urban and Regional Planning, University of Wisconsin-Madison; M.U.R.P., Urban and Regional Planning, University of Wisconsin-Madison; M.P.S., City and Regional Planning, Western Kentucky University; B.S. Chemistry, Weber State University. 26 years experience in urban and environmental planning. • Project Manager
Nicolas Smal GIS/Environmental Technician Cotton/Bridges/Associates	B.A., Environmental Science, Whittier College. 2 years of experience in GIS and environmental analysis. • GIS Analyst

BRG CONSULTING, INC.

D. Sean Cardenas Manager of Environmental Planning BRG Consulting, Inc.	M.A equivalent and subsequent doctoral studies, Anthropology, Southern Illinois University; B.A., Anthropology, University of Chicago; Twenty years experience in land use and environmental planning. • Land Use Study review, QA/QC
Ralph C. Kingery Project Manager BRG Consulting, Inc.	M.S., Urban Planning, University of Arizona; B.F.A., Industrial Design, University of Illinois (Urbana); Twenty years experience in environmental planning and land use analysis. AICP certification. • Land Use Study Manager, San Diego County alignments
Kevin A. Smith Environmental Analyst BRG Consulting, Inc.	B.S., Environmental Science, California Polytechnic State University; two years experience in environmental planning and land use analysis. • Corridor and station mapping, data interpretation
Diane M. Catalano Environmental Analyst BRG Consulting, Inc.	B.A., Environmental Studies, University of San Diego. • Data interpretation and compilation, preparation of descriptive text sections and references.
Edward Arcadia CAD/Graphics Tech. BRG Consulting, Inc.	B.A., Political Science, with minors in Urban Planning and Visual Arts, University of California, San Diego. • Corridor and station reconnaissance, data mapping

Appendix A

ESTIMATED RUNNING TIMES @ 220 mph max									
			Length		Maximum Speed		Running Time (including 6%)	Average Speed	
SEGMENT 1									
	Alignment 1a	UP Colton Line	66.8 miles	(107.5 Km)	220 mph	(354.1 Kph)	28.5 minutes	141 mph	(226.2 Kph)
	Alignment 1b	UP Riverside Line	67.9 miles	(109.3 Km)	187 mph	(300.9 Kph)	46.0 minutes	89 mph	(142.5 Kph)
	Alignment 1c	I - 10 Freeway	63.8 miles	(102.7 Km)	220 mph	(354.1 Kph)	43.4 minutes	88 mph	(142.1 Kph)
	Alignment 1d	SR 60 Freeway	62.9 miles	(101.2 Km)	160 mph	(257.5 Kph)	37.4 minutes	101 mph	(162.3 Kph)
	Alignment 1e	BNSF - SR 91	70.2 miles	(113.0 Km)	140 mph	(225.3 Kph)	52.2 minutes	81 mph	(130.0 Kph)
	Alignment 1f	UP Colton to SB	73.6 miles	(118.4 Km)	187 mph	(300.9 Kph)	36.4 minutes	121 mph	(195.5 Kph)
	Alignment 1ba	UP Riverside / UP Colton	67.5 miles	(108.6 Km)	220 mph	(354.1 Kph)	31.0 minutes	131 mph	(210.6 Kph)
SEGMENT 2									
	Alignment 2a	More Tunnels	70.3 miles	(113.1 Km)	220 mph	(354.1 Kph)	20.4 minutes	207 mph	(333.5 Kph)
	Alignment 2b	Less Tunnels	71.8 miles	(115.6 Km)	220 mph	(354.1 Kph)	20.8 minutes	207 mph	(333.7 Kph)
SEGMENT 3									
	Alignment 3a	Carroll Canyon	20.1 miles	(32.3 Km)	187 mph	(300.9 Kph)	14.1 minutes	86 mph	(137.7 Kph)
	Alignment 3b	Miramar Road	19.8 miles	(31.9 Km)	187 mph	(300.9 Kph)	13.5 minutes	88 mph	(142.0 Kph)
	Alignment 3c	I 15 / SR 52	20.4 miles	(32.8 Km)	187 mph	(300.9 Kph)	12.2 minutes	100 mph	(161.6 Kph)
	Alignment 3d	I 15 / SR 163	15.7 miles	(25.3 Km)	187 mph	(300.9 Kph)	7.1 minutes	133 mph	(213.5 Kph)
	Alignment 3e	I 15 to QualComm	10.1 miles	(16.3 Km)	187 mph	(300.9 Kph)	4.2 minutes	143 mph	(230.0 Kph)
	Alignment 3f	I 15 / SR 163 / I 8	17.5 miles	(28.2 Km)	187 mph	(300.9 Kph)	9.5 minutes	110 mph	(177.1 Kph)
Notes:									
	1. Assumes system maximum speed of 220mph, not all segments can achieve 220 mph.								
	2. Considers curve speed restrictions and reasonable operating speeds.								
	3. 6% schedule recovery allowance included.								
	4. Station Dwell times NOT included.								